



**INTERNATIONAL MONOHULL OPEN CLASS ASSOCIATION**

**WORLD SAILING INTERNATIONAL CLASS**

# **Class Rule 2025**

[English Version]

**Text applicable from 1st race 2022**

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Compared to Class Rule 2021 V4.1, the modifications are indicated by a vertical line in the left-hand margin.

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# INTRODUCTION

The aim of these rules is to establish the restrictions, exclusions and obligations to which all *IMOCA*s competing in ocean racing shall comply.

The *IMOCA* Class Rule is an 'Open' rule, which means that anything which is not expressly forbidden, restricted or enforced is permitted.

These rules are constantly evolving, and must be developed in such a way as to prioritise:

- Safety at sea,
- Sporting equity,
- Performance enhancing technical innovation,
- Cost control for boats and projects/campaigns,
- 'Sustainable development' of boats and our sporting practice.

The rules related to equipment manufactured by *IMOCA*'s chosen suppliers apply solely to *IMOCA*s fitted with this equipment.

The *IMOCA*s Class has been approved as a World Sailing 'International Class' since 2001.

## *IMOCA*'S APPROACH

- To contribute to the preservation of the environment and the protection of marine biodiversity.
- To put in place all the necessary resources to satisfy the annual goals set out by the *IMOCA* teams' Charter
- To optimise the use of renewable energies with the aim of being self-sufficient in energy by 2024.
- To adhere to World Sailing Environmental Code.
- To gauge and understand one's carbon footprint in order to meet the objectives set by the Paris Agreement in 2030.

## ENVIRONMENTAL CODE FOR OFFSHORE RACES

World Sailing and *IMOCA* are committed to the promotion of care for the environment.

As a general rule and when offshore racing, one shall:

- Use grey and black water holding tanks where fitted and empty them at appropriate pump-out stations on land or when at least 6 nautical miles offshore.
- Use absorbent materials to recover oil in the bilges and dispose of these ashore in appropriate containers.
- Use environmentally friendly cleaning products suitable for the marine environment.
- Keep rubbish aboard which can be recycled once ashore or dispose of it in a bin ashore, except during long passages when biodegradable rubbish may be thrown overboard.
- Not use 2-stroke engines
- Use solar, wind and hydropower wherever possible.
- Use toilets ashore when the boat is in port.
- Follow the recommendations of the IMO [International Maritime Organization] with regard to biological antifouling products.
- Implement a *lifecycle analysis* to appraise the carbon footprint by using the 'Marine Shift 360' tool for the construction of any new boat.

## CHAPTER I – ADMINISTRATION

## Section A – General points

### A.1 LANGUAGE

[a] French and English are the two official *IMOCA* languages.

In the event of a discrepancy with regard to a translation, the French text shall prevail.

[b] The words 'shall' and 'must' indicate something that is mandatory.

[c] With the exception of the titles of the appendices, paragraphs and Notes, the terms printed in:

- 'Bold' refer, without exception, to an ERS definition and the name of the Class *IMOCA*,
- 'Italic' refer to an RRS definition,
- 'Italic' and 'underlined' refer to a definition contained in the CR.

### A.2 ABBREVIATIONS AND DEFINITIONS

#### A.2.1 ABBREVIATIONS

CM	<i>IMOCA</i> Chief Measurer
COLREGS	International Regulations for Preventing Collisions at Sea
CR	<i>IMOCA</i> Class Rules
CRC	<i>IMOCA</i> Class Rules Committee
ERS	Equipment Rules of Sailing
FFV	French Sailing Federation
GMDSS	Global Maritime Distress and Safety System
ISO	International Organization for Standardization
MC	<i>IMOCA</i> Measurement Certificate
NDT	Non-Destructive Material Test
OSR	World Sailing's (WS) Offshore Special Regulations
PBO	Zylon® or equivalent fibres
RM	Righting moment
RRS	Racing Rules of Sailing
SK	Dyneema®, Spectra® (UHMWP fibres)
WS	World Sailing (International Sailing Federation)

#### A.2.2 DEFINITIONS

A definition in the singular includes the plural and a masculine definition includes the feminine.

*Air draught*: The vertical distance between the highest point of the mast and the boat's flotation waterplane at rest, at zero degrees of heel and in *lightweight configuration*.

**Boat**: The equipment used by the crew to take part in a race.

It includes: **hull**, *hull appendage(s)*, **ballast**, **rig**, **sail(s)**, fittings and all other items of equipment used but excludes consumables, **personal equipment** and **portable equipment**.

*Boat*: hull shell, *hull appendages*, **ballast** and **rig** but not including the structure, the **sails**, fittings and associated attachments, watertight bulkhead doors and emergency exits, companionway hatch(es) and all other items of equipment used, consumables, **personal equipment** and **portable equipment**.

*Boat reference*: orthonormal X, Y, Z reference in which the boat is positioned at rest, with zero heel and in *lightweight configuration*. The X axis is the intersection between the *hull's plane of symmetry* and the flotation waterplane. The X axis originates from the hull's aftermost point on the *hull's plane of symmetry*. The X values increase towards the forward section. The XY plane is horizontal and corresponds to the flotation waterplane.

*Bunk*: A tubular frame with a flexible material suspended inside.

*Carbon budget*: The room for manoeuvre available to skippers, builders and architects of the boats to implement measures to reduce greenhouse gas emissions on a global scale.

Carbon footprint appraisal: An assessment of the quantity of carbon dioxide gas emitted into the atmosphere over the course of a year.

Checklist: The lightweight configuration control and compliance document. This document is described in the measurement protocol.

Cloth: A ply of fibres, unidirectional or otherwise.

Commercially produced: A fitting, a product or a piece of equipment available to all competitors, at a reasonable market price and within a reasonable timeframe.

The **modifications** made to this fitting, product or piece of equipment shall be limited to its normal installation, use or set-up and shall be able to be validated by the CM.

Crew: A group of more than three people brought aboard for a *race*, which may include a mediaperson (OBR).

Degree of freedom: The ability to carry out a translation or rotation type movement, along or around any axis.

Dock sail: Standard equipment which is solely used in port for communication and promotion purposes.

Draught: The vertical distance between the lowest point of the boat and the boat's flotation waterplane at rest, at zero degrees of heel, in lightweight configuration.

Foil: A hull appendage primarily used to produce lift and/or affect: leeway, stability, elevation or righting moment.

**Hull**: The hull shell including the transom, the deck including any superstructure, the internal structure including any cockpit(s), and the fittings associated with these parts.

Hull appendage: Any item of equipment which is wholly or partially below the sheer line or its extension when fixed or when fully exposed if retractable, attached to the hull shell or another hull appendage, and used to affect: stability, leeway, steerage, directional stability, motion damping, trim, displaced volume.

Hull length: The shortest distance between the two perpendicular planes situated on the centre plane and the flotation waterplane, when the boat is at rest, with zero heel and in lightweight configuration, passing through:

- the aftermost point of the **hull**, with its hull appendages,
- and the foremost point of the **hull**.

A pushpit, pulpit, stanchion, antenna mast and its antennae, wind turbine, solar panel and hydrogenerator shall not be included in the calculation of the hull length.

Hull's plane of symmetry: the vertical XZ centre plane of the boat reference when the boat is at rest, with zero heel and in lightweight configuration.

IMOCA: The term used to designate the association that manages WS's international IMOCA Class or to designate a sailing monohull whose hull length is a maximum of 60 feet and that adheres to the rules and standards described in the CR.

Keel: The standard keel fin together with its bulb that shall be considered as a single hull appendage.

Life-cycle assessment: The assessment and quantification of the physical flows of material and energy associated with human activity, from the start of a boat's manufacture through to its end of life.

Lightweight configuration: This configuration, with its associated conditions, is described in CR Appendix H.

LOA: The hull length to which the forward and aft spar overhangs are added.

Measurement protocol: A document that lists all procedures and methods used for measuring, calculating and inspecting an IMOCA.

Mediaperson (OBR): A crew member who shall comply with the CR in the same way as every other member of the crew.

Monohull: A boat with a single **hull**:

- with a single flotation plane in lightweight configuration or under sail in normal sailing trim, excluding any flotation waterplanes created by hull appendages, the rig, the hydrogenerators and the propulsion system for the 'main' engine.
- whose hull shell depth, below the widest point of all the transverse sections, shall not decrease towards the boat's centre plane [See D.1(b)].

Number of appendages: It is the number of intersections between a hull appendage and the hull shell that shall determine the number of appendages.

Renewable energy: Energy that is produced by the effects of the sun and/or the sea and/or the wind.

Rudder: A moveable hull appendage primarily used to affect yaw, which shall not be designed to provide vertical lift.

Scientific equipment: Multidisciplinary equipment or instruments benefiting the understanding and/or observation of the marine and aquatic environment and which do not assist with the boat's performance.

Skipper: The IMOCA member responsible for the **boat when racing**.

Standard boom: A **spar** attached to one end of the **boat** and to which the mainsail **clew** can be mounted. It comprises its **rigging**, with the exception of the **running rigging** and the blocks associated with the **running rigging**. This spar is manufactured by IMOCA's chosen suppliers according to the specifications referred to in the CR appendix M.

Standard canting system: A system that controls the standard keel fin, which is manufactured by suppliers chosen by IMOCA according to specifications referred to in CR Appendix B.

Standard communication system: Equipment which is manufactured by suppliers selected by IMOCA according to specifications referred to in CR Appendix P.

Standard keel fin: A hull appendage primarily used to affect stability and leeway and onto which a single bulb is attached. This hull appendage is manufactured by suppliers chosen by IMOCA according to specifications referred to in CR Appendix B.

Standard mast: A mast with outriggers and rigging, which are manufactured by suppliers chosen by IMOCA according to specifications referred to in CR Appendix C.

Sustainable development: The ability to promote sustainable and innovative performance whilst maintaining an intrinsic balance between the social, economic and environmental activities synonymous with our day-to-day operations.

Through-hull fitting: A system that enables the passage through the **hull**, which meets the requirements of the CR.

Transom: The aftermost structural element that connects the hull shell to the deck and/or the cockpit and closes off the aftermost watertight compartment.

Transverse: For a watertight bulkhead to be transverse, it shall be continuous between the starboard side of the **hull**, the port side of the **hull** and the deck.

Working deck: The area inside the perimeter created by the pulpits, stanchions, lifelines and pushpits, where any crew member may stand, or pass frequently or move around, whilst carrying out the usual manoeuvres necessary when under way and maintaining the **boat when racing**.

Yaw: The movement of the boat around a vertical axis that passes through its centre of gravity

### A.3 AUTHORITY

WS has delegated the management of the international IMOCA Class to IMOCA.  
IMOCA administers the CR.

### A.4 CLASS MANAGEMENT

IMOCA's operating procedures are defined in its statutes and its Class Rule, which are published annually.

### A.5 CLASS MEMBERSHIP

The skipper shall be an active member of IMOCA.

### A.6 CLASS RULE MODIFICATIONS

- [a] All CR modifications must be approved by vote at a General Meeting by the IMOCA members.
- [b] RRS Rule 87 is applicable:  
"The Notice of Race [or Sailing Instructions] may change a class rule only when the class rules permit the change, or when written permission of the class association for the change is posted on the official notice board."
- [c] All modifications to the CR shall be subject to WS's approval.
- [d] Except in matters of extreme urgency, any modification to the CR dealing with stability, the basic structures of the hull, masts and hull appendages, shall be made at the General Meeting that specifically deals with the Class Rule and which takes place in the year of the start of the Vendée Globe.  
For the CR specific to crewed races, these modifications shall be made at the General Meeting, which takes place either in the year of the start or, prior to the finish of the crewed round the world race at the latest.
- [e] If a modification of the Class Rule entails high costs and/or significant technical modifications to be made to existing boats, the Grandfather Rule, when described in CR Appendix A, makes existing boats exempt from the requirement to conform to the new rule.
- [f] If an immediate modification of the CR is required, IMOCA's Executive Committee may decide how to proceed. This modification shall become permanent following approval by the IMOCA members at the next General Meeting.

### A.7 CLASS RULE INTERPRETATIONS

#### A.7.1 CLASS RULES COMMITTEE

- [a] The CRC comprises 3 people nominated by IMOCA's Executive Committee and confirmed by a vote put to the members of IMOCA at the next General Meeting.  
The composition of the CRC is described in CR Appendix F.  
Where possible, it comprises:
  - a person independent of any project,
  - a naval architect not involved in an IMOCA project,
  - a WS representative specialised in rules and regulations.
- [b] The CRC's decisions are final and cannot be contested by an event jury, including an international jury, nor by any other procedure with any other legal court or tribunal.

#### A.7.2 INTERPRETATION

- [a] CR interpretations shall be made by IMOCA who shall delegate this responsibility to the CRC, who may, at its sole discretion, issue an interpretation.
- [b] Any request for interpretation of the CRs shall be made in writing to the CM, who shall pass it on to the CRC



[c] Requests for interpretations may only be made by *IMOCA* members or the CM.

[d] All interpretations shall be made in writing at the first opportunity and shall be posted on the *IMOCA* website.

[e] The origin of a request for interpretation shall remain confidential.

[f] The cost of a request for interpretation shall be set by *IMOCA*'s Executive Committee.

## A.8 BOAT MEASUREMENT CHECKS AND INSPECTIONS

### A.8.1 CHIEF MEASUREUR AND MEASURER

[a] The CM is mandated by *IMOCA* to issue or suspend a MC.

[b] The decisions of the CM may be submitted to the CRC for validation via a request for interpretation but cannot be contested by an event jury, including an international jury, nor by any other legal court or tribunal.

[c] The CM and other *IMOCA* approved measurers are the only ones permitted to carry out the inspections, checks and measurements required to issue a MC.  
Their names and contact details can be found in CR Appendix F.

### A.8.2 BOAT INSPECTION

[a] All procedures, inspections, tests, measurement procedures and calculations required to issue a MC are described in the *measurement protocol*.

[b] The data, measurements, documents and information that the CM and/or *IMOCA* measurers gather to generate a MC shall remain confidential.

[c] The CM may request a measurement check or inspection to be carried out on any boat at any time.

[d] When requested the data recorded whilst sailing shall be given to *IMOCA*.  
The data shall remain confidential and shall be used by *IMOCA* solely for the purpose of improving and/or verifying the safety and design of the equipment and standard parts.

### A.8.3 KEEL INSPECTION

[a] Before its first launch a *keel* shall be subjected to an NDT.

[b] The validity of an NDT is a maximum of 4 years and shall date back less than 2 years for the boat to be able to participate in a round the world race.

[c] A *keel*'s NDT shall cover the entire period of validity of the MC and shall only be valid for a single round the world race.

[d] To obtain a MC the *keel*'s NDT report shall be sent to the CM.

### A.8.4 MAST INSPECTION

[a] Before its first use, then every two years and in the year of the start of a round the world race, a mast shall be subjected to an NDT.

[b] To obtain a MC the mast's NDT report shall be sent to the CM.

### A.8.5 HULL INSPECTION

[a] A hull shall be subjected to an NDT in the year of the start of a round the world race.

[b] The hull NDT report shall be sent to the CM.

## A.8.6 DAMAGE REPORT

Following structural damage, the *skipper* or his or her designated representative must, within 10 days of the incident, provide the CM with an inspection report covering the damaged section together with details of the circumstances of the damage then, within 60 days, the studies to determine the causes and a report detailing the **modifications** and/or **repairs** made.

## A.9 *IMOCA* MEASUREMENT CERTIFICATE

### A.9.1 ISSUING A MC

- [a] *IMOCA* is the only authority authorised to issue or suspend a MC.
- [b] The MC is issued in the name of a **boat** and its *skipper* who shall be a paid-up active *IMOCA* member.
- [c] The *skipper* may appoint a representative to monitor all the checks, inspections and measurement operations, as well as the administrative steps required to obtain a MC.  
The *skipper* shall remain the sole person responsible with regard to the CR for the conformity of the boat with the MC and shall sign the MC.
- [d] The costs related to the various steps in the process for issuing a MC are set by *IMOCA*'s Executive Committee.
- [e] To be issued with a MC the **boat** shall be subjected to all checks, tests, measurements and inspections that the CM deems necessary.
- [f] A boat whose first MC is issued prior to 1 January 2005 cannot obtain a valid MC to *compete* in the Vendée Globe 2024.

### A.9.2 MC VALIDITY

- [a] A MC is valid for the race(s) referred to in the MC unless the CM modifies its validity period.
- [b] A **boat** shall hold only one valid MC at a time. A new MC automatically invalidates the previous MC.
- [c] The CM may defer a MC at any time.
- [d] In the case of a skipper change the new skipper shall request a renewal of the MC.
- [e] All **modifications** or **repairs** to the boat require the MC to be renewed as described in A.9.4.

### A.9.3 FIRST MC

- [a] To obtain the first MC, the *skipper* or the *IMOCA* member responsible for the construction of the boat, shall submit the 'new build declaration form' [see CR Appendix K-2] to the CM before work on the construction of the **hull** commences.
- [b] The CM and measurers shall have unlimited access to the **boat** throughout the construction period.
- [c] The *skipper* or the *IMOCA* member responsible for the construction of the boat shall supply the CM with all the documents listed in CR Appendix K-3.

### A.9.4 MC RENEWAL

To renew a MC the *skipper* shall submit to the CM the form in CR Appendix K-4, detailing any **modifications** or **repairs** carried out on the boat.

### A.9.5 SUBMITTING OF THE MC FOLLOWING MODIFICATION TO THE BOAT

- [a] All **modifications** or **repairs** made to the boat following the date of issue of the MC shall be the subject of a written report sent to the CM.
- [b] All unreported **modifications** or **repairs** made to the boat render the current MC invalid.
- [c] The CM shall consider which specific inspections and tests are required to issue a new MC.

## A.10 DOCUMENT STORAGE

IMOCA shall hold all documents that it has used when issuing a currently valid MC. All documents shall be filed confidentially.

## A.11 EXCEPTIONAL CASES

[a] In view of an unforeseen event and/or exceptional circumstance and/or within the context of *sustainable development* and/or in view of the use or installation of new energy solutions, which make it impossible for the *skipper* to adhere to one or several of the measures set out in the CR, a *skipper* may request dispensation from applying one or several of the CR measures for the purposes of being issued a MC.

[b] In the event of a request for an exemption from the application of one or more provisions of the CR in order to obtain a MC, the *skipper* shall submit to the CM in writing all the elements in his or her possession, along with a written waiver of all claims against the CM. The CM shall submit a report to the IMOCA President.

Maintaining sporting equity and the highest safety standards will be insisted upon for both crew and **boat**.

The CM shall make a decision after consultation with IMOCA's President.

[c] Decisions regarding exemptions from the application of one or more provisions set out in these CR for the purposes of being issued a MC are available from the IMOCA secretariat (contact@imoca.org).

## Section B – ELIGIBILITY

### B.1 CLASS RULES AND CERTIFICATION

[a] Only a skipper holding a valid MC in the name of its **boat** may enter a race. *When racing* the *skipper* shall comply with the CR at all times.

[b] In the event of damage during a race, the **boat** may fall out of compliance with the CR and still be allowed to finish the race. Non-compliance with all the CR may only be as a result of damage and shall not, under any circumstances, be advantageous to the *skipper*.

[c] The **boat** shall have all the required certification marks.

### B.2 HULL AND SAIL NUMBERS

[a] IMOCA shall allocate a boat's sail number.

[b] A hull number issued by the CM shall be moulded or engraved on the boat's *transom*.

## CHAPTER II – CONDITIONS AND RESTRICTIONS

### Section C – Conditions for racing

#### C.1 MOVABLE BALLAST

The second sentence of RRS Rule 51 is replaced as follows:

“Any stacking for the purpose of changing trim or stability is permitted within the limits set out by these rules:

- [a] Food supplies, drinks, equipment and gear, which is not permanently sealed or attached, may be moved when not being used for its intended purpose, provided that once these elements are in position, they must be securely attached to the inside of the **hull**.
- [b] Sails not being used shall be either:
  - [i] on a furler, rigged and ready to be deployed,
  - [ii] on the deck inside the working deck,
  - [iii] inside the **hull**.
 Sail bags shall not be watertight.
- [c] Moveable hull appendages shall not be moved beyond their normal positions.
- [d] The main safety elements described in CR C.3, when not being used for their primary purpose, shall be permanently stowed according to the stowage plan described in CR C.3.1.
- [e] The skipper shall only bring aboard with him what is reasonable and necessary for each race and under no circumstances shall he bring aboard extra equipment and supplies designed to affect the stability of the boat.”

## C.2 OUTSIDE HELP, SERVO POWER AND MANOEUVRING

- [a] RRS Rule 52 is replaced as follows:  
 “A boat’s standing rigging, running rigging, sails, spars, foils or daggerboards shall be adjusted and operated only by the power provided by the crew. Only the keel, the rudders and the filling, transferring and emptying of the ballast tanks may be adjusted and operated by power not provided by the crew.”
- [b] Servo power is expressly forbidden with the following exceptions:
  - [i] adjustment and operating of the keel and, where applicable, a standard canting system, using solely the gear and equipment supplied;
  - [ii] rudders to affect the yaw.
- [c] The crew’s physical exertion alone shall be used to manoeuvre and trim the boat directly. This power shall not be stored in a storage system, even temporarily, before use.
- [d] *When racing*, the skipper shall not receive any:
  - [i] personalised weather assistance,
  - [ii] performance assistance,
  - [iii] a remote intervention relating to any of the boat’s equipment,
  - [iv] personalised medical assistance by a person without informing the race’s referral doctor,
  - [v] organised psychological assistance

## C.3 SAFETY EQUIPMENT

All material and equipment described in rules C.3.1 to C.3.25 inclusive shall be:

- [a] on board,
- [b] of solid construction,
- [c] installed, remain in place and be easily accessible,
- [d] stowed securely,
- [e] functioning correctly and regularly maintained,
- [f] inspected and serviced according to the manufacturer’s instructions,
- [g] suitable for the number of crew on board who shall all be instructed in their use.

### C.3.1 STOWAGE PLAN

A weatherproof stowage plan shall be displayed inside the boat near the main companionway hatch(es), with the location of the safety gear and equipment.

### C.3.2 DRAINING

- [a] Two buckets of stout construction, each fitted with a lanyard, and each with a minimum capacity of 9 litres.
- [b] Two electric bilge pumps, each with a minimum output of 2400 litres/hour. One of these two systems shall be permanently installed and not moved.
- [c] One of the systems mentioned in CR C.3.2(b) shall enable each watertight compartment to be emptied from outside the latter. The other system must be able each watertight compartment to be emptied.
- [d] The bilge pumps shall have a minimum rated capacity of 12000 litres/hour and may be combined to meet this requirement.

### C.3.3 EMERGENCY DRINKING WATER SUPPLY

- [a] An emergency drinking water supply, stored in one or several containers must be sealed.
- [b] The container(s) shall not move and shall be sealed in place.
- [c] The total volume of water shall depend on the duration of the race and the number of crew on board and shall be defined in the Sailing Instructions of each race.

### C.3.4 LIFERAFTS

- [a] The life rafts shall not be movable and shall be sealed in place.
- [b] These life rafts shall be:
  - (i) One life raft built to SOLAS standards.
    - The location of this life raft shall be attached outside, aft of the main companionway hatch(es) and be able to be easily launched.
    - The life raft shall be a cannister-type and equipped with a SOLAS Pack A.
    - Where it is impossible to include a SOLAS A pack in this life raft, an associated grab bag shall be firmly secured with the life raft and shall contain water, food and flares to make up the difference between the B pack and the A pack for at least 4 persons with the following minimum quantities: 6 litres of drinking water, 2 kg of high-energy food rations, 2 parachute flares, 3 hand flares and 3 buoyant smoke signals.
    - The end of the life raft's painter shall be permanently fixed to a strong point on the boat.
  - (ii) One life raft compliant with the ISO 9650-1-A PACK 2 [<24h] standard.
    - The life raft shall be stowed inside.
    - The life raft shall be capable of being passed through all watertight bulkheads and hatchways, giving access to the outside, including the transom escape hatch.
- [c] For a *crewed* race, the on-board life rafts shall be described in the Notice of Race.

### C.3.5 MAN OVERBOARD RECOVERY

- [a] Two lifebuoys, with the boat's name permanently displayed on their surfaces within reach of the steering position:
  - (i) A permanently buoyant lifebuoy (foam-filled for example), equipped with marine grade reflective material, a sachet of fluorescent water dye marker, a whistle, a self-igniting light and a drogue,
  - (ii) A lifebuoy equipped with marine grade reflective material, a sachet of fluorescent water dye marker, a whistle, a self-igniting light and a drogue.
- [b] A life-sling, that shall be strong enough to hoist a crew member on board and easily accessible from the cockpit. It shall consist of:
  - (i) a floating line of at least 36000 mm in length,
  - (ii) a floating horseshoe that provides at least 90N of buoyancy.

- [c] A 'Jonbuoy Mark V'-type system with an integrated AIS beacon and automatic triggering shall be permanently installed at the stern.

### C.3.6 LIFEJACKETS

- [a] One lifejacket per crew member [to ISO 12402-3 (Level 150 N) standard or equivalent, including EN 396 or UL 1180 standards], that shall be:
  - (i) equipped with a whistle and fitted with marine grade retro-reflective material,
  - (ii) compatible with the wearer's safety harness,
  - (iii) equipped with a crotch strap,
  - (iv) clearly marked with the boat's name,
  - (v) have an emergency position indicating light in accordance with either ISO 12402-8 or SOLAS LSA code 2.2.3,
  - (vi) have a sprayhood in accordance with ISO 12402-8,
  - (vii) have a PLB beacon as mentioned in C.3.15 [c], registered with the appropriate authority.
- [b] At least one spare 'Rearming kit' for each lifejacket on board, along with a spare activation system for each automatically inflating lifejacket.
- [c] At least one spare lifejacket in accordance with rule CR C.3.6[a] without the equipment described in CR C.3.6[a][vii].

### C.3.7 SAFETY HARNESS AND TETHERS

- [a] Each crew member shall have a safety harness and a tether that complies with the ISO 12401 standard or equivalent.
- [b] Each harness shall be equipped with a tether measuring 1000 mm long, with a snap hook at each end.
  - (i) A mid-point snap hook on a 2000 mm safety line may be used.
  - (ii) All hooks shall be self-closing.
  - (iii) Safety tethers shall have a coloured flag embedded in the stitching to indicate excessive load. A tether that has been overloaded shall be replaced.

### C.3.8 PERSONAL EQUIPEMENT

Each member of the crew shall have on board and shall carry as much as possible:

- [a] a sharp knife,
- [b] a waterproof torch,
- [c] a personal AIS beacon,
- [d] on deck at night, a chemical lightstick and emergency personal position-indicating light (SOLAS or strobe light).

### C.3.9 PERSONAL SURVIVAL EQUIPMENT

Each crew member shall have:

- [a] A set of vacuum-packed warm clothing;
- [b] An immersion suit including head, hands and feet protection that shall:
  - (i) have an immersed thermal insulation value, without thermal underwear, of at least 0.75 Clo.
  - (ii) be stowed in a bag attached near the companionway hatch(es) [less than 1500 mm from the centre of the opening].

### C.3.10 COCKPIT KNIFE

A strong, sharp knife sheathed and securely attached and readily accessible from the deck or a cockpit.

### C.3.11 SOFT PLUGS

Soft conic plugs of appropriate sizes shall be attached or permanently stowed adjacent to every *through-hull fitting*.

### C.3.12 EXTINGUISHERS

- a)** At least two fire extinguishers of at least a 2 kg capacity each suitable for A, B and F-rated fires. They shall be easily accessible:
- (i)** One extinguisher shall be close to the engine.
  - (ii)** The other extinguisher shall be close to the companionway hatch(es) [less than 1500 mm from the centre of the opening].
- (b)** A fire blanket adjacent to the galley installation.

### C.3.13 RESERVED

### C.3.14 RADAR

- (a)** A Pulse Radar with a minimum power of 2 KW or a Broadband-type radar. They must:
- (i)** be programmable to scan periodically with automatic switch on and off.
  - (ii)** have an external alarm on deck and/or in the cockpit(s).
- (b)** The radar antenna/radome shall be situated at a height of at least 5000 mm above the flotation waterplane when the boat is at rest, with zero heel and in *lightweight configuration* and weigh a minimum of 5.5 kg.

### C.3.15 DISTRESS BEACONS

- (a)** Two portable COSPAS-SARSAT distress beacons, certified long-life (minimum 48-hour autonomy), with hydrostatic and manual activation.  
These beacons shall not be mobile and shall be:
- (i)** dual frequency (406MHz and 121.5MHz) and equipped with a GPS,
  - (ii)** coded and registered in the name of the boat with the corresponding MMSI number,
  - (iii)** securely attached with a line of at least 3000 mm in length whose breaking load shall be at least 1000 kg
  - (iv)** immediately accessible near the main companionway hatch(es).
- (b)** A personal distress beacon (PLB), transmitting on two frequencies (121.5MHz and 406MHz) for each member of the crew.

### C.3.16 EMERGENCY TRANSMISSION

At least one *through-hull fitting* which, when the hull is at 180 degrees, enables the installation of:

- (a)** a VHF antenna.
- (b)** a COSPAS-SARSAT antenna, or any other position indicating radio beacon.
- (c)** an Iridium satellite telephone antenna.

### C.3.17 FLOATING ANCHOR/DROGUE

| A floating anchor/drogue suitable for an *IMOCA* and certified by *IMOCA*.

### C.3.18 FIRST AID KIT

- (a)** The contents of the emergency first aid kit shall conform to the recommendations of the on board first aid manual. The contents of the first aid kit shall reflect the type of race and the size of the crew.

- [b]** The first aid kit shall incorporate the latest edition of one of the following manuals:
- International Medical Guide for Ships, World Health Organization, Geneva,
  - First Aid at Sea, by Douglas Justins and Colin Berry, published by Adlard Coles Nautical - London,
  - Le Guide de la Médecine à distance, by Dr J-Y Chauve, published by Distance Assistance BP33 – La Baule Cedex France. An English version is available.
  - Skippers' Medical Emergency Handbook, First Aid at Sea, by Dr Briggs and Dr Mackenzie, published by Adlard Coles Nautical - London.
  - Another First Aid manual in the *skipper's* language approved by the CM.
- [c]** An emergency first aid kit prepared by the *skipper* containing what he or she considers to be a top priority, shall be securely stowed and easily and readily accessible near the main companionway hatch(es) [less than 1500 mm from the centre of the opening].

### C.3.19 DIVING EQUIPMENT

- [a]** One 'Spare Air' dive tank or equivalent with a minimum volume of 80 litres of air.
- [b]** A full-body wetsuit with gloves, flippers and a face mask.

### C.3.20 WATERTIGHT EMERGENCY CONTAINER

- [a]** One watertight emergency container equipped with solid handles and a lanyard with a minimum breaking load of 1000 kg shall:
- (i)** be unsinkable;
  - (ii)** have a minimum surface area of 0.1 m<sup>2</sup> of fluorescent orange colour on the outside;
  - (iii)** have the name of the boat permanently marked on the outside;
  - (iv)** be permanently attached close to the main companionway hatch(es) [less than 1500 mm from the centre of the opening];
- [b]** It shall contain a minimum of:
- (i)** A handheld, waterproof VHF radio with charged spare batteries.
  - (ii)** A handheld, waterproof Iridium telephone [or in a waterproof case] with charged spare batteries.
  - (iii)** A handheld, waterproof GPS unit with charged spare batteries.
  - (iv)** A waterproof torch with charged spare batteries.
  - (v)** A knife.
  - (vi)** Several Cyalume-type chemical light sticks.
  - (vii)** Several fluorescent sea dye markers.
  - (viii)** An individual SOLAS or strobe light with charged spare batteries for each crew member.
  - (ix)** 4 red hand flares and 2 orange smoke hand flares compliant with SOLAS LSA Code Chapter III Visual Signals.
  - (x)** Several high-energy foods of a total minimum value of 10000 KJ.
  - (xi)** A survival blanket for each crew member.

### C.3.21 ANCHORS AND TOWING WARPS

- [a]** Two anchor sets. Each anchor set shall:
- (i)** consist of an anchor, a chain and a 50000 mm long, 18 mm diameter pre-stretched polyamide warp, which may be used for both anchoring and towing.
  - (ii)** be sealed in the same place with its own warp.
  - (iii)** be able to be readied on deck in less than 3 minutes.
- [b]** The total weight of the two anchor sets, without their warps, shall be a minimum of 75 kg.

### C.3.22 TORCHES

- [a]** A high-powered waterproof torch or spotlight capable of being flashed. It shall be rechargeable or shall have charged spare batteries.
- [b]** Each member of the *crew* shall have a waterproof torch capable of being flashed, each associated with its own charged spare batteries and bulbs.



### C.3.23 TOOLS AND SPARE PARTS

Tools and spare parts, including effective means to quickly disconnect the standing rigging from the **hull**.

### C.3.24 EMERGENCY TILLER SYSTEM

| An emergency tiller system shall be on board.

### C.3.25 PROTECTION

One helmet to a minimum standard of CE EN 1077 or CE EN 966 or ASTM 2040 or equivalent.

## C.4 MEDICAL AND SURVIVAL TRAINING

Training courses are highly recommended for all crew members.

- [a] Before the start of a race the *skipper* (and his *co-skipper* if the race is double-handed) shall have:
- [i] attended a medical training course at least once in the previous five years of the standard required for the race due to be sailed;
  - [ii] attended a WS-approved sea survival course at least once in the previous five years.
- [b] Regular courses that cover, safety, rescue and salvage techniques for *skippers* and *co-skippers* are organised by *IMOCA*.  
*Skippers* and *co-skippers* shall participate in these courses unless they have written exemption signed by *IMOCA*'s Executive Committee.

## C.5 ADVERTISING

- [a] The *skipper* may display advertising on the boat he is responsible for.
- [b] A circle measuring 3000 mm in diameter on each side of the bottom third of the mainsail and above the first reef, or a space to be defined equivalent to a total surface area of 7.0 m<sup>2</sup>, shall be free of all advertising.  
This space shall be reserved for potential promotional branding by the race organiser where an agreement is reached with *IMOCA*.
- [c] The official logo or the *IMOCA* partner logo or the *IMOCA* class insignia or the championship logo, shall be displayed back-to-back at the top of the mainsail as well as on one sleeve of the technical clothing worn by the skipper and team members.
- [d] Depending on the agreements reached between *IMOCA* and the event organiser, one or more dodgers displaying *IMOCA* and/or event organiser branding shall be displayed on both sides of the boat:
- [i] in port, at the race start and finish,
  - [ii] under tension on the lifelines towards the stern of the boat.
- [e] The branding layout is described in CR Appendix E.
- [f] A maximum surface area of 1.0 m<sup>2</sup> shall be made available on the boat to *IMOCA* to display the technical partners or those associated with *sustainable development*.
- [g] *Dock sails* shall adhere to CR appendix E.

## C.6 ENERGY / MOTOR

### C.6.1 MOTOR / GENERATOR

- [a] Overview:
- [i] A motor or a generator shall be:
    - diesel,
    - safely and permanently installed and protected to the norms of best practice,
    - attached to the boat and not moved.
  - [ii] A motor or a generator shall not be:

- used *when racing* to move the boat,
- moved inside the boat.

**(iii)** All or part of the motor equipment and its propulsion system shall have the ability to be sealed *when racing* in such a way that it shall not propel the **boat**.

**(b)** The 'main' propulsion unit shall be installed in such a way as to propel the boat and to meet the following performance standards at all times:

- a traction load of 280 daN at a fixed point for at least 15 minutes,
  - a speed of 5.0 knots in any direction with an autonomy of at least 5 hours,
- This performance shall be capable of being checked at the finish of a race.

**(c)** For a diesel engine or generator:

- (i)** The exhaust, cooling and fuel systems shall be permanently installed.
- (ii)** All required fuel for a race shall be contained in fixed fuel tanks and not moved.
- (iii)** Fuel tanks shall be permanently installed, adequately protected and not moved.
- (iv)** Each fuel tank shall be able to be closed.
- (v)** The transferring of fuel between tanks is expressly forbidden. The use of a day tank, or header tank, whose volume is less than or equal to 10 litres and which is installed close to the 'main' motor is exempt from this limitation.
- (vi)** If used as the 'main' propulsion unit the diesel engine shall have a builder's power rating of at least 35HP and, unless a written exemption is provided by the CM, shall be chosen from one of the following commercially produced engines: Yanmar 3JH5E, Lombardini LDW 1404, Nanni diesel N4.38, Volvo D2-40.
- (vii)** The standard components associated with the 'main' propulsion unit shall not be removed or modified with the exception of the electrical cabling and the alternators, their mountings and pulley systems.

**(d)** The control(s) for the 'main' propulsion unit used for the 'forward' and/or the 'reverse' (gearbox) must be accessible from the exterior steering position and must be capable of being sealed.

**(e)** The 'main' propulsion unit propeller shall:

- be positioned under the flotation waterplane when the boat is at rest, with zero heel and in lightweight configuration,
- not be retractable,
- not be installed on a hull appendage.

**(f)** A fuel reserve of 20 litres of fuel, for emergency use on the 'main' propulsion unit, shall be stored in an independent tank which shall not be moved.

This fuel reserve shall:

- (i)** comply with CR C.6.1 (c),
- (ii)** be connected to the engine with a valve, which shall be able to be sealed in the closed position,
- (iii)** be ready for use.

**(g)** *When racing*, the engine propeller shall have a standard system for detecting use of the propeller shaft, the terms for which are referred to in the measurement protocol.

## C.6.2 BATTERIES

**(a)** The batteries shall not be moved when the boat is underway and shall be:

- (i)** waterproof or a gel-electrolyte type,
- (ii)** be fixed so that they do not move, regardless of the attitude of the **boat**,
- (iii)** be capable of being sealed in position.

**(b)** When an electric motor is used to start the 'main' propulsion unit, it shall have a separate battery or electrical source with an independent charging system, whose primary aim is to start this propulsion unit.

**(c)** No processes or systems using fissile materials or acid-based batteries for the production or storage of energy shall be installed on board.

**(d)** Batteries shall be commercially produced.

### C.6.3 FUEL

The only fuels allowed on board are:

- [a] diesel for a diesel engine, a generator and/or a heating system;
- [b] gas for cooking and safety equipment.

## C.7. NAVIGATION

### C.7.1 COMPASS

[a] A 'marine' magnetic compass shall be permanently installed, be independent of any electrical supply and correctly adjusted with a deviation card.

[b] An additional compass to that required above shall also be carried on board.

### C.7.2 NAVIGATION EQUIPMENT

[a] A 25W marine VHF transceiver radio with ASN, equipped with a fixed antenna.

[b] An active AIS with navigational software which displays AIS targets, equipped with a masthead AIS antenna.

[i] A certificate of conformity for the AIS installation dated less than 12 months previously shall be submitted to the CM to obtain a MC. The terms are referred to in the *measurement protocol*.

[ii] The AIS shall be Class A or Class B+.

[c] A handheld waterproof VHF radio.

[d] An emergency VHF/AIS antenna.

[e] A Sat Com transceiver.

[f] A GPS.

[g] A 'YB3i Tracker' connected to the service battery.

[h] An echo sounder

[i] A boat speed measuring device.

[j] GMDSS-type equipment for round the world races.

[k] A *standard communication system* which shall comply with CR Appendix P.

### C.7.3 NAVIGATION DOCUMENTS

Navigation charts, which are not solely electronic, light lists and chart plotting equipment for the geographic zones covered by the race shall be onboard.

## C.8 IDENTIFICATION

[a] To assist with identification at sea the sail number shall be displayed and highly visible on deck. The minimum dimensions of the characters shall be:

- Height: 900 mm
- Width: 600 mm
- Thickness: 120 mm
- Gap between numbers: 180 mm.

[b] To assist rescue parties in effecting emergency evacuations an area of the hull, which can be easily destroyed, shall be clearly marked out in high visibility contrasting paint colours on the inside and the outside of the hull.

[c] A bright and highly visible colour shall be applied to:

- the entire surface of the keel,
- the entire surface of the *rudders*,

and outside on a single area of not less than 2.0 m<sup>2</sup>:

- on the underside of the hull shell,
- on the deck.

## C.9 BOAT: FIT-OUT AND EQUIPMENT

### C.9.1 WORKING DECK

- [a] The ISO 15085 – Category A – Man Overboard Prevention and Recovery Standard applies as a minimum and is supplemented by the following specifications as far as CR C.9.7 inclusive.
- [b] When the boat is at rest, with zero heel and in *lightweight configuration*, the *working deck* surfaces level with the stanchion, pulpit and pushpit feet, with the exception of those mentioned as far as CR C.9.2[a](i), shall be:
- (i) inside the sheer line;
  - (ii) situated at least 500 mm inside the projection of the sheer line along the XY plane of the *boat reference*.
  - (iii) at the back of boat, forward of the straight line passing through the two aftermost points of the sheer line on each side of the **hull** within a 500 mm limit.
- [c] The *measurement protocol* describes the method for establishing the sheer line.

### C.9.2 PULPITS, PUSHPITS, STANCHIONS AND LIFELINES

#### [a] Overview

- (i) The pulpits, pushpits, stanchions and lifelines shall:
- make the *working deck* safe in a permanent manner;
  - be fastened along the *hull length*; it is expressly permitted for any fastenings forward of the pulpit to be attached to the forward spar;
  - have a minimum height above the *working deck* of:
    - 600 mm
    - 800 mm where the cockpit finishes aft of the **hull**.
- (ii) There shall be a minimum of two lifelines surrounding the *working deck*
- (iii) There shall be no carbon fibre in the pulpits, pushpits and stanchions
- (iv) The CM shall be satisfied that the pulpits, pushpits and lifelines render the area inside the *working deck* a safe place for crew members to carry out all their work.
- (v) The pulpits, pushpits and stanchions shall be fabricated from stainless steel tube with a minimum wall thickness of 1.5 mm. The stanchions shall be a minimum of 30 mm in diameter and the pushpits and pulpits a minimum of 25 mm in diameter except for stanchions of **boats** with a valid MC dated before 15 October 2020 that shall have a minimum diameter of 28 mm. From 1 January 2023, these **boats** shall have pulpits, pushpits and stanchions fabricated from stainless steel tube with a minimum wall thickness of 1.5 mm. The stanchions shall be a minimum of 30 mm in diameter and the pushpits and pulpits a minimum of 25.
- (vi) The stanchions shall be inclined a maximum of 10 degrees with the exception of CR C.9.2 [b](v).

#### [b] Pulpit and pushpit

- (i) The pulpit shall be of tubular one-piece construction.
- (ii) The pulpit shall have at least four points structurally attached to the deck of the boat.
- (iii) The pulpit shall enclose all forestay anchorages that are on the deck of the boat.
- (iv) The gap between a pushpit and any part of the boat shall not exceed 450 mm, while the pulpit can have a gap, provided that the opening is a maximum of 500 mm and is located at a minimum height of 300 mm.
- (v) Lifelines with adapted stanchions are accepted as a pushpit.

#### [c] Lifelines

- (i) All lifelines shall be:
- permanently in place and correctly tensioned,
  - supported solely by the pulpit, pushpits and stanchions at intervals of a maximum of 2200 mm,

- made of SK-sheathed rope over their entire length with a minimum exterior diameter of 6 mm.

**(ii)** All lashings, links, anchor points and other components that make up the lifelines shall have a breaking load at any point superior to that of the lifeline itself.

**(iii)** The vertical gap between two lifelines shall be less than 380 mm and the gap between the deck and the lower lifeline shall be less than 300 mm.

### C.9.3 JACKSTAYS / ATTACHMENT POINTS

#### **[a] General requirements**

Jackstays shall enable:

- a crew member to clip on before coming on deck from inside the boat and unclip after going below deck,
- a crew member to move freely between working areas in the cockpit and on deck whilst remaining clipped on, including being able to cross the deck from one side to the other, with the minimum of attachment and detachment operations.

Attachment points shall allow two crew members to be clipped on simultaneously without depending on the jackstays.

Special care should be taken regarding the use of U-bolts as attachment points as they can lead to accidental opening of some snap hook models.

**[b]** The jackstays shall be:

- installed along the deck to port and to starboard of the centre plane and shall not be moved.
- securely attached to the deck.
- made of webbing or SK rope with a minimum breaking strain of 20 kN.

**[c]** Attachment points shall be securely fastened close to the steering positions(s), the winches, the mast and everywhere members of the crew work for long periods of time.

### C.9.4 TOE RAILS

A toe rail with a minimum height of 30 mm shall be permanently installed around the *working deck*, except in the way of fittings and at the base of the *transom*.

The toe rail shall be fitted as close as practicable to the stanchion bases.

### C.9.5 HANDHOLDS AND HANDRAILS

**[a]** The boat shall be equipped with adequate handholds placed inside and on deck to facilitate the safe movement of crew around the boat at sea.

**[b]** A suitable system of handholds or handrails securely and permanently fixed along the entire length of the immersed edge of the *transom* shall be fitted with the aim of assisting a crew member who has gone overboard with gripping onto it and climbing back on board.

### C.9.6 NAVIGATION LIGHTS

**[a]** Navigation lights shall comply with the COLREGS relating to sailing vessels whilst under sail, motoring or at anchor.

**[b]** Navigation lights for sailing shall:

- be mounted so that they will not be masked by sails or the heel of the boat.
- be mounted above deck level and at least at the height of the lower lifeline

**[c]** The reserve/auxiliary navigation lights shall:

- (i)** have the same specifications as the above-mentioned lights,
- (ii)** be permanently installed and shall not be moved,
- (iii)** have an independent wiring circuit to that of the primary navigation lights.

**(iv)** The reserve/auxiliary navigation lights shall be permanently installed in a different position to the primary navigation lights and shall not be moved.

**[d]** An anchor light shall be permanently installed.

## C.9.7 THROUGH-HULL FITTINGS, SEA COCKS AND VALVES

Seacocks (quarter turn valves or guillotine valves), watertight valves and their control systems shall be permanently installed on all through-hull openings below the flotation waterplane when the boat is at rest, with zero heel and in *lightweight configuration*, except in the case of integral deck scuppers, logs, sounders and other similar equipment.

## C.10 BOAT: LIFE ON BOARD

### C.10.1 BUNKS

- [a] One or more *bunks* shall be permanently installed on board and not be moved.
- [b] The number of *bunks* on board shall be a minimum of half the number of crew on board and rounded up if the number after the decimal point is greater than or equal to 5.
- [c] Each *bunk* shall be suitable for the size and weight of the crew members.

### C.10.2 COOKING FACILITIES

A cooking stove shall be safely installed and permanently accessible with secure access to a fuel shut-off control capable of being safely operated in a seaway.

### C.10.3 DRINKING WATER

- [a] The *skipper* shall be responsible for ensuring there is adequate drinking water on board for the duration of the race and the size of the crew.
- [b] A *commercially produced* desalinator capable of being operated both manually and electrically shall be compulsory on board.  
For races of over 5000 nautical miles in length, two *commercially produced* desalinators capable of being operated both manually and electrically shall be permanently installed and one of these shall not be moved.
- [c] For crewed races, CR C.10.3 (b) is replaced with the following:  
"A minimum of two freshwater tanks, each with a capacity of at least 40 litres and at most 60 litres, shall be symmetrically installed around the hull's symmetry plane. Freshwater tanks shall not be used for liquids other than drinking water and shall not be filled, emptied or transferred to modify trim or stability. A *commercially produced* desalinator with a minimal nominal capacity of 20 litres per hour shall be permanently installed on board and connected to the freshwater tanks."

### C.10.4 TOILET

A boat shall have a toilet installed.

## C.11 HYDRAULIC SYSTEMS

No hydraulic systems shall be installed on board a boat except for:

- o the *keel* canting system;
- o the second *degree of freedom foil* adjustment system;
- o the trimming of the headsails tack point, the cunningham and the outhaul.

## C.12 IDENTIFICATION ON SAILS

RRS 77 and G.1.1 are modified as follows:  
The display of letters and numbers on a mainsail, spinnaker and headsail is optional. This also applies to Offshore Special Regulation 4.01.1.

## Section D – Hull

## D.1 FUNDAMENTAL RULES

- [a] The **boat** shall be a *monohull* equipped with:
  - (i) a *standard keel fin*,
  - (ii) a *standard canting system*,
  - (iii) one *standard mast*.
- [b] When upright, at rest, with zero heel and in *lightweight configuration* a *boat* shall be symmetrical about its longitudinal centre plane.
- [c] The **boat** shall be calculated, built and maintained to compete in OSR Category 0 races.
- [d] With regard to OSR 3.03.1, the boat shall:
  - (i) be designed, built and maintained to conform with the ISO 12215 Category A Standard, as amended by a body identified, approved and validated by *IMOCA*;
  - (ii) obtain a certificate of compliance from a body identified, approved and validated by *IMOCA* regarding the *IMOCA* build plan inspection;
  - (iii) obtain a signed and dated declaration from the builder that the boat was built in conformity with the drawings by a body identified, approved and validated by *IMOCA*.

## D.2 DIMENSIONS

- [a] The *hull length* shall be a minimum of 17983 mm and a maximum of 18288 mm [60 feet].
- [b] *LOA* shall be a maximum of 20117 mm [66 feet]. When the rake is between 4.0 and 6.0 degrees, it is expressly permitted for the boom to have a maximum of a 25 mm overhang aft.
- [c] The beam of the **hull** shall not exceed 5850 mm.
- [d] The beam of the **hull** section on the YZ plane of the *boat reference*, 1000 mm behind the foremost extremity considered to determine the *hull length*, shall not be greater than 1120 mm.
- [e] The curve, formed by the projection [on the XY plane of the *boat reference*] of the points, whose coordinates at Y for each transverse hull section are a maximum, shall not display an inversion of the curvature between the foremost point [considered to determine the hull length] and the transverse section of the hull at Bmax.
- [f] The freeboard shall be a minimum height of 1550 mm up forward and 1050 mm aft level with the **hull** sheer line and along a length measuring in excess of 1000 mm.

## D.3 HULL MATERIAL LIMITATIONS

The **hull** and *hull appendages*, less associated fittings, shall be built according to CR appendix G.

## D.4 BUOYANCY VOLUME

- [a] The boat shall have a total buoyancy volume greater or equal to 110% of the boat's displacement in *lightweight configuration*.
- [b] The *measurement protocol* describes the volume calculation.

## D.5 STABILITY AND RIGHTING MOMENT LIMITS

### D.5.1 OVERVIEW

- [a] *IMOCA*, under the authority of the CM, shall determine the theoretical stability curve for different configurations of the boat in *lightweight configuration* with the measurements taken during the stability tests, information provided by the *skipper* and measurements taken by the measurers to verify the different stability criteria described in D.5.2, D.5.3, D.5.4 and D.5.5.

(b) The *measurement protocol* describes the conditions, the methodology, the process used for the different stability tests, the measurements taken and the calculations made.

#### D.5.2 AVS WORST CASE [AVSwc]

(a) To calculate AVSwc, the boat shall be considered to be in *lightweight configuration*:  
(i) with all ballast tank combinations on the same side filled, including centre line tanks if any,  
(ii) with the *keel* swung fully to the same side,  
(iii) with all equipment and mobile *hull appendages* in the least favourable position,  
(iv) without taking into account the spar's buoyancy.

(b) With the boat in the configuration described in CR D.5.2 (a), the least favourable value of AVSwc shall be greater than or equal to 110 degrees.

#### D.5.3 STABILITY CURVE AREA RATIO

(a) For the area calculations the *keel* shall be in the centre plane of the boat which shall be in *lightweight configuration* with the foils in the least favourable position.

(b) With the boat in the configuration described in CR D.5.3 (a), the positive area under the stability area curve shall be at least 5 times greater than the negative area.

#### D.5.4 MAXIMUM RIGHTING MOMENT

(a) To calculate the maximum RM the boat shall be in *lightweight configuration* with:  
(i) All ballast tank combinations on the same side filled, including centreline tanks if any,  
(ii) The *keel* swung fully to the same side,  
(iii) All equipment and mobile *hull appendages* in the least favourable position.

(b) With the boat in the configuration described in CR D.5.4 (a), the RM shall be less than or equal to 25.5 TM [tonne metres] at 25 degrees of heel.

#### D.5.5 SELF-RIGHTING

(a) For the numerically calculated 180-degree self-righting test, the boat with the *keel* fully canted to one side and the foils in the least favourable position, shall be considered to be in *lightweight configuration* but without: the *standard mast*, standing rigging and boom.

(b) When in the configuration described in CR D.5.5 (a) the boat shall right itself from 180 degrees of heel.

#### D.6 WATER BALLAST

(a) A ballast tank shall only be filled with sea water to the exclusion of any other liquid.

(b) A maximum of 4 ballast tanks may be fitted.

(c) The ballast tanks shall be installed symmetrically inside the **hull**.

(d) All associated equipment [plumbing / valves / snorkels /...] shall be permanently installed in the boat and shall not be moved.

(e) Water shall be able to freely circulate inside each ballast tank and shall be able to reach the lowest point of the tank.

(f) Each ballast tank shall have a removable inspection hatch to reach the lowest point of the tank.

#### D.7 COCKPITS

(a) The ISO 11812 Standard shall apply [Watertight cockpits, quick-draining cockpits, design category A].



- (b) A semi-fixed sill/washboard is allowed but shall conform to 8.2.4 [Other requirements] of ISO 11812 Standard, and it shall only open outwards.

## D.8 WATERTIGHT COMPARTMENTS

For the application of D.8 and D.9, refer to the report authored by Bureau Veritas, outlining the pressure generated by the sloshing of liquid inside a compartment.

This report is available from the *IMOCA* secretariat (contact@imoca.org).

### D.8.1 WATERTIGHT BULKHEADS

- (a) The required watertight bulkheads shall be built in such a way as to be capable of withstanding the pressure of a direct head of water in the neighbouring compartment without any leakage.
- (b) A watertight bulkhead shall be *transverse*.
- (c) There shall be a minimum of 5 watertight bulkheads to make up 6 watertight compartments.
- (d) No part or element of any 2 watertight bulkheads shall be separated by more than 5000 mm.
- (e) The foremost watertight bulkhead shall be less than 2740 mm aft of the foremost point of the **hull** whilst the boat is at rest, with zero heel and in *lightweight configuration*.
- (f) A 'rigid structure to limit water ingress' shall be installed around the zone where the *foil* passes through the hull shell along a minimum height of 500 mm.
- (g) A "rigid structure to limit water ingress" shall be installed around the zones where the *keel* bearings are attached to the **hull**.

### D.8.2 WATERTIGHT BULKHEAD DOORS

- (a) Whatever the attitude of the boat, it shall be capable of being inspected from bow to stern by passing through the watertight bulkhead doors.
- (b) The watertight bulkhead doors, if they are not permanently installed, shall be stowed as close as possible to their associated opening and shall be easily put in place to quickly make the bulkhead watertight.
- (c) The watertight bulkhead doors and their locking systems shall be capable of withstanding the pressure generated by the water in an adjacent flooded compartment.

### D.8.3 CRASH BOX

A crash box, made of closed-cell foam, capable of being destroyed without affecting the integrity of the hull should the boat be involved in a head-on collision, shall be fitted in the bow of the boat.

## D.9 HATCHES AND EMERGENCY EXITS

### D.9.1 EMERGENCY EXITS

- (a) The boat shall have at least two emergency exits:
- (i) with a minimum opening of 0.2 m<sup>2</sup> and a geometry allowing the interior life raft and the crew to pass through in survival suits;
  - (ii) equipped with a sturdy and watertight closing mechanism operable on the inside and the outside that controls the locking mechanism if any;
  - (iii) capable of resisting the pressure of the water regardless of the sea conditions and the attitude of the boat.
- (b) At least one emergency exit shall be forward of the mast.
- (c) At least one emergency exit, all of which shall be within 500 mm of the aftermost point of the **hull**.

This emergency exit shall be above the flotation waterplane, with the boat at rest, in *lightweight configuration*, so that the crew can pass through it in both directions when the boat's angle of heel is anywhere between 0 and 180 degrees.

## D.9.2 COMPANIONWAY HATCH

The main companionway hatch(es) shall be equipped with a solid and watertight closing system, capable of being operated by just one person from both the inside and the outside, including when the boat is inverted.

## D.9.3 OPENING HATCHES

- (a) No hatch shall open into the **hull** (except portholes with a surface area less than 0.071 m<sup>2</sup>).
- (b) Opening hatches shall be positioned in such a way that they shall always be above the flotation waterplane when the **hull** is heeled over 90 degrees.  
They shall be permanently installed, capable of being closed immediately and remain closed regardless of the sea conditions or the attitude of the boat.
- (c) Hatches, their locking systems and associated equipment, shall remain watertight and resist the pressure of water when the boat is inverted.

## Section E – Hull Appendages

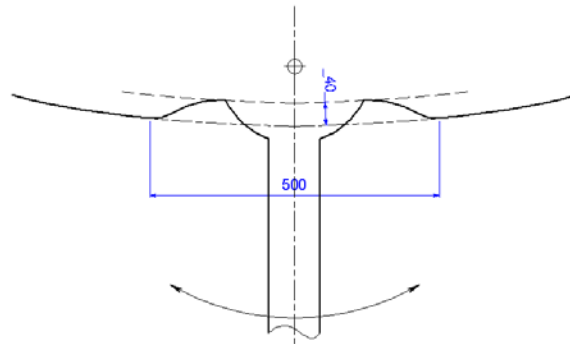
### E.1 OVERVIEW

- (a) Any appendage on the hull shall be a *hull appendage* and shall be either: a *keel*, a *rudder* or a *foil*.
- (b) There shall be no more than 5 *hull appendages*.
- (c) The volume and dimensions of a *hull appendage* shall not be designed in such a way as to enable it to be considered to be a **hull**.
- (d) Allowing for exceptions for the application of rule E.4(i), no combined movement (helical, etc.) is permitted for any *hull appendage*.
- (e) Flaps and deformable surfaces shall be expressly forbidden on *hull appendages*.  
**Hull** appendage deformations due to operational loading and on which no control can be exerted are exempt from the above limitation.
- (f) *Foil* casings shall not open into the hull, with the exception of the watertight inspection hatches, whose openings are entirely above the flotation waterplane of the boat, when at rest, with zero heel and in *lightweight configuration*.
- (g) Materials whose specific density is greater than 11.4 shall be expressly forbidden in any *hull appendage*.
- (h) The *draught* shall not exceed 4500 mm when the boat is at rest, with zero heel and in *lightweight configuration*.
- (i) All *hull appendages* shall have an identification mark placed on them by the CM and the *hull appendages*, other than the *keel*, shall conform to CR Appendix G.

### E.2 KEEL

- (a) The *standard keel fin* and *standard canting system* shall conform to CR Appendix B.  
The latter shall not be altered and solely the fairing may be modified locally at the bulb to keel joint and/or close to the hull shell.
- (b) All links, fixings and connections that make up the different elements of the *standard keel fin* and the *standard canting system* shall be made in accordance with CR Appendix B.

- [c] The longitudinal angle of the rotational axis of the keel shall be between 4.0 and 9.0 degrees with respect to the flotation waterplane of the boat, at rest, with zero heel and in lightweight configuration.
- [d] The keel shall have only one degree of freedom.
- [e] The lateral angle at which the keel may rotate around its axis of rotation shall be a maximum of 38 degrees on each side.  
Appropriate and sealed mechanical stops shall be installed on each side to limit the movement of the keel to the angle at which the stability calculations are made.  
Proof (drawings, measurements taken by the measurer before assembly, etc.) that a mechanical stop has been placed at the base of the ram shall be provided.  
A hydraulic and/or electrical stop shall not be accepted.
- [f] The keel shall be able to be:  
(i) manually operated from inside, whatever the attitude of the boat;  
(ii) locked in the centre plane with the emergency safety system supplied with the standard canting system.
- [g] Solely for technical reasons associated with the correct functioning of the keel, the definition of a monohull can be waived in the zone surrounding the hull-to-keel junction.  
The exclusion zone is limited in width to 500 mm overall, from one side to the other, and a maximum depth of 40 mm above the projected faired surface of the hull shell, extended if necessary, in line with the diagram below.



- [h] To safely use this equipment the skipper shall follow the standard keel fin and standard canting system instructions that are included in Note 1 supplied by the manufacturers on delivery of the components.
- [i] The keel shall not be equipped with appendages or any other equipment or system that could produce lift and/or influence the righting moment, leeway, stability or elevation.

### E.3 BULB

- [a] The **boat** shall have one bulb attached to the standard keel fin. The bulb shall conform to CR Appendix B.
- [b] The penetration of the standard keel fin into the bulb shall conform with CR Appendix B.  
The centre of gravity of the bulb shall be forward of the torsional axis of the standard keel fin.  
The bolts used to attach the bulb to the keel fin shall be made of high tensile 17-4 PH stainless steel or equivalent.
- [c] The weight of the bulb shall be between 2200 and 2850 kg.

### E.4 FOIL

- [a] There must be 2 foils.
- [b] The foil must be a solid structural unit; its geometry must be a single, continuous surface at every point. The foil section must be a continuous closed contour less the fittings associated with the degrees of freedom. All or part of a foil of a T and/or Y shape and/or similar is expressly prohibited.

(c) A foil shall adhere to the following maximum limits:

- (i) a static moment of 8.00 m<sup>3</sup>,
- (ii) a total developed surface area of 7.70 m<sup>2</sup>,

(d) No point of each foil shall exceed 5750 mm on either side of the hull's symmetry plane when the two foils are retracted symmetrically.

(e) The Y value of the centroid of each foil section, shall not decrease from the hull's plane of symmetry to the end of the foil when the latter is fully extended. It is expressly permitted for the centroid values of this foil's end sections to decrease from a single series of normal foil sections within a maximum Y limit of 105 mm and a maximum Z limit of 210 mm and this shall be the case whatever the second degree of freedom, if it exists.

(f) It is expressly permitted to attach one or several fixed fences on each foil to avoid a local ventilation phenomenon.

This type of fence shall:

- (i) be non-mobile in relation to the foil;
- (ii) be attached to the perpendicular section of the foil;
- (iii) measure less than 50 mm wide on each side of the foil blade.

(g) A foil must pass just once through the hull shell. The intersection between the foil and the hull shell shall be above the flotation waterplane when the boat is at rest, with zero heel and in lightweight configuration.

(h) A foil shall be able to retract into and extend out of the hull shell and shall use only one degree of freedom for this movement. The section of foil which retracts into and extends out of the hull shell shall have normal constant sections.

(i) It is expressly permitted for a foil to have a second degree of freedom. If it exists, this degree of freedom shall be a rotation of the foil, which shall be limited to an angle of 5.0 degrees.

(j) No device shall be used to induce distortion of the foil. Solely distortion generated by hydrodynamic forces and those generated by systems associated with the movement(s) of the foil in E.4 are expressly permitted.

(k) Grounding: In the event that the foil suffers significant impact, it must be demonstrated to the CM that its installation enables the integrity of the watertight compartment around the foil casing to be retained.

(l) The characteristics of the associated foil system must be validated with the CM prior to its implementation on the boat.

(m) In general, the measurement protocol details how to check the conformity of the foils' characteristics and their installation in the boat to check the whole set-up complies with the CR.

## E.5 RUDDER

(a) The number of rudders shall be 2.

(b) The 'fully lowered' position of a rudder shall be its normal use mode.

(c) When in the 'fully lowered' position the rudder shall be included in the hull length.

(d) In all cases where the rudder is stable and fixed in a position other than the 'fully lowered' position, the CM must be satisfied that the rudder has no effect on the flow of water on and outside the hull shell.

(e) The rudder's attachment points to the hull shall be fixed and shall not be moved.

(f) All points along the leading and trailing edges of the rudder shall be in the same plane.

(g) Below the hull shell, a fence may be fitted on each rudder to avoid local ventilation.

This type of fence shall be:

- (i) Non-adjustable in relation to the rudder,

- (ii) Perpendicular to the *rudder's* axis of rotation in the transverse plane,
- (iii) Attached within an area of 200 mm below the hull shell when the *rudder* is 'fully lowered',
- (iv) No wider than 30 mm on each side of the *rudder* blade.

## Section F – RIG

### F.1 STANDARD MAST

- (a) The boat shall be equipped with a *standard mast* which shall:
  - (i) conform to CR Appendix C,
  - (ii) hold an *IMOCA* certificate of conformity,
  - (iii) be weighed in the configuration defined by the CM and, if necessary, have corrector weights added.
- (b) To use the *standard mast* safely and in seamanlike fashion, the *skipper* shall follow the instruction manual for stepping and use of the *standard mast* as described in Note 2 provided by the builder upon delivery.
- (c) The *standard mast* shall not be **modified** (structural or cosmetic **modifications**) except for any element that can be defined as 'running rigging and fittings not essential to the primary purpose of the mast as elements of rigging', and **modifications** permitted in Appendix C.
- (d) All **repairs** shall be made following the CM's approval and under his control.

### F.2 AIR DRAUGHT AND MAST

- (a) The *air draught* shall not exceed 29000 mm when the boat is at rest, with zero heel and in *lightweight configuration*.
- (b) Whilst sailing the mast rake shall not be adjustable. It will be measured when the boat is at rest, with zero heel and in *lightweight configuration* and shall be between 2.0 and 6.0 degrees.
- (c) A mast able to be inclined in the lateral plane is expressly forbidden and the mast shall never be inclined to windward from the centre plane of the *boat*.
- (d) The shrouds and tie-rods shall never be disconnected or adjusted when underway at sea.

### F.3 STANDING RIGGING

- (a) The standing rigging shall conform to CR Appendix C.
- (b) Forestay 2 shall be non-releasable and non-adjustable *when racing*.

### F.4 OUTRIGGERS

RRS 55.3 is modified as follows:

- (a) The outriggers that form part of the *standard mast* shall be used solely for holding up the rig and trimming the sails.
- (b) Other outriggers may be used solely to assist with sail trim, either to *windward* or to *leeward*. These outriggers can be stowed on deck and, where this is the case, astern of the aftermost point considered to determine *LOA*.

### F.5 STANDARD BOOM

- (a) The boat shall be equipped with a *standard boom* which shall:
  - (i) comply with appendix M,
  - (ii) receive *IMOCA* conformity approval,
  - (iii) be weighed in a configuration defined by the CM with the relevant corrector weights.

[b] To safely use this equipment, the *skipper* shall follow the instructions set out in the specifications for installation and use of the *standard boom* that are included in Note 3 supplied by the builder on delivery of the component.

[c] The *standard boom* shall not be modified [structural or cosmetic **modifications**] save for those that could be defined as 'running rigging and non-essential fittings related to the primary purpose of the boom as rigging elements', and **modifications** permitted in CR appendix M.

[d] All **repairs** shall be made following approval from the CM and under his control.

## Section G - SAILS

### G.1 OVERVIEW

[a] The number of sails on board shall be at most 8.

[b] A sail shall never be positioned:

- (i) above the highest point of the mast,
- (ii) ahead of the forward point considered to determine *LOA*,
- (iii) behind the aft point considered to determine *LOA* [See D.2(a) and (b)].

### G.2 LIMITATIONS

[a] The number of sails the boat shall sail with per year is specified in CR appendix N.

[b] Inflatable battens [battens, luffs...] are expressly forbidden for sails.

### G.3 HEADSAILS

[a] A storm jib headsail, with a surface area of between 14 and 25 m<sup>2</sup>, made of a heavyweight *cloth* and of a high visibility colour shall be on board and shall be capable of being safely set in heavy weather conditions.

[b] *When racing*, the J2 shall be permanently attached to Forestay 2.

[c] Specifications:

- [i] Headsails shall be furled when they are not in use, except for spinnaker-type sails [sail with a half width greater than or equal to 75% of the sail foot length].
- [ii] Headsails with a surface area greater than 200 m<sup>2</sup> shall have no battens.

### G.4 IDENTIFICATION

All sails on board shall be stamped by the CM as specified in CR Appendix N, which details the limits in the number of sails a boat is permitted to have.

### G.5 SAIL MATERIAL

Carbon fibre shall not be used in sails.

## Section H – Electronic equipment

Any sensor with a factory gate price in excess of €10,000 ex. VAT shall be *commercially produced* and form part of a list validated by the CM. This list is specified in appendix Q.

## CHAPTER III – APPENDICES TO THE CLASS RULES

### Appendix A: Grandfather Rules

The rules in Chapters I and II relating to standard equipment apply to *IMOCAs* fitted with this.

A boat which has been issued a MC prior to 1 January 2013 can apply the grandfather rules referred to in CR 2021 V4.0.

It is permitted not to adhere to a rule from the CR in force solely with the proviso that a grandfather rule expressly permits it.

A grandfather rule is applicable according to:

- the date of the first MC
- or the date of the new build declaration form
- or the date the relevant equipment is measured.

The lists of grandfather rules applicable according to these criteria are detailed in CR AA.13.

## AA.1 Overview

**AA.1.1** Boats benefiting from a grandfather rule shall not make **modifications** that go against the intention of any new rules.

**AA.1.2** One or several of the CR D.2(c) & (d); D.6(b); E.4(b)&(c)&(d)&(e)&(k) in particular, may not apply.

## AA.2 Hull

**AA.2.1** A boat issued a MC which modifies the form of the hull shell, including below the sheer line [bottom+upperworks] over a surface area of 50% or more, must adhere to all the CR relating to a new boat. The date the first MC is issued for this boat defines the initial form of the hull shell to be considered. It cannot accrue modifications over time which exceed the value indicated in this rule, namely less than 50%.

**AA.2.2** A boat which has its hull modified cannot have its maximum beam increased beyond the value it had prior to modification, when its last MC was issued, unless the maximum beam of the **hull** was less than 5.85 m.

**AA.2.3** In the event that a **hull** is modified, a boat shall adhere to CR D.3. Where it is deemed impossible to adhere to this rule and prior to any modifications to the **hull**, authorisation must be obtained from the CM to use materials specific to the **hull** in question.

**AA.2.4** The maximum beam of the forward section of the hull shell, recorded at 1000 mm aft of the foremost point to determine the length of the boat, shall not be greater than 1120 mm.

**AA.2.5** CR D.2(f) does not apply to a boat which benefits from a grandfather rule.

**AA.2.6** Where existing hull shell and deck moulds are reused and they are employed to build an *IMOCA*, it is expressly permitted for CR D.2(f) not be applied on the stipulation that the sheer line heights of these existing moulds are retained and that no modification shall lead to a reduction of these heights.

## AA.3 Structure and NDT of the boat

**AA.3.1** For a boat that has not had a MC renewed for four or more years the *skipper*, or the designated representative, shall provide an NDT of the boat, close to the date of the request for a MC renewal.

This NDT shall be:

- prepared by a reputable qualified surveyor and carried out in good faith using all appropriate methods;
- submitted to the CM.

The CM will decline to accept such an inspection report if he deems it to be incomplete or carried out by a surveyor without the required level of competence.

IMOCA's Executive Committee can, at its sole discretion and without justification, ask the CM not to issue a MC.

**AA.3.2** The **hull** of a boat (excluding associated fitout and corrector weights) may be built without conforming to specifications set out in CR appendix G.

**AA.3.3** The sections of the CR AG.1 relating to T800S fibre and the nominal weight of each *cloth*, do not apply.

**AA.3.4** CR AG.2(c)&(d) do not apply.

| **AA.3.5** CR AG.2(e) does not apply.

| **AA.3.6** Where existing hull shell and deck moulds are reused and they are employed to build an *IMOCA*, it is expressly permitted to use *cloth* weighing a minimum of 150 g/m<sup>2</sup> within a 5% limit of the **hull weight**.

#### **AA.4 Stability**

**AA.4.1** When carrying out a 180-degree self-righting test, the boat with the keel fully canted to one side shall be considered to be in *lightweight configuration* but without: the mast, standing rigging and the boom. The self-righting test shall be carried out numerically in this configuration and the boat shall right itself from 180 degrees of heel.

**AA.4.2** The AVSwc value shall be greater than 110°.

**AA.4.3** The AVSwc value shall be greater than 108°.

#### **AA.5 Keel**

| It is expressly permitted not to conform to the theoretical static stresses and loads referred to in CR AB-1.3.

#### **AA.6 Mast and Rig**

| It is expressly permitted for the Forestay 2, Forestay 3, Forestay 3 (without sail), the running backstays and the running backstay deflectors referred to in CR AC.3(c) and ordered prior to 15 April 2021 not to be those supplied with the *standard mast*.

#### **AA.7 Boom**

**AA.7.1** The gooseneck shall be on the deck or equipped with an easy release pin in the event of a dismasting.

**AA.7.2** Where a boom does not conform, a 6000 mm long tube (2 x 3000 mm sections able to be sleeved) shall be on board capable of being used to make a jury rig.

| **AA.7.3** CR F.5 may not apply.

#### **AA.8 Pushpits, pulpits and lifelines**

**AA.8.1** The pulpit may be in 2 parts and open provided that the opening between the pulpit and any part of the boat (a non-releasable fixed forestay is a part of the boat, releasable forestays are not considered part of the boat at this point in the rule) is never greater than 360 mm.

**AA.8.2** It is not possible to connect the 2 parts of the pulpit with an SK-sheathed lifeline when the pulpit is in 2 parts and open and that the opening between the pulpit and any part of the boat is greater than 360 mm.

**AA.8.3** There may be a single break in the continuity of the lifelines each side of the boat of a maximum of 500 mm, usually measured at the lifeline, provided there is an overlap of at least the same length as the existing opening.

#### | **AA.9 Foil**

| It is expressly forbidden to replace a *foil*, which does not conform to CR E.4 with a new *foil* built in identical fashion.

#### | **AA.10 Foil measured for the first time prior to 15 October 2020**

**AA.10.1** CR E.4(b)&(c)&(d)&(e) do not apply.



**AA.10.2** To use a *foil*, which does not conform to CR E.4 [c], the boat at rest, with zero heel and in *lightweight configuration* shall have a mast rake of between 2.0 and 4.0 degrees and the *foil's* second *degree of freedom* shall be limited to 3.0 degrees.

**AA.10.3** To be expressly permitted, the *foil*, its geometric shape, its penetration into the boat and the associated systems shall not be modified. The shape of the *foil*, its penetration and the associated systems shall remain identical, except with a view to adhering to E.4 [c](i).

**AA.10.4** *IMOCA 60s* equipped with these *foils* are not required to adhere to CR appendix O.

## **AA.11 A foil measured for the first time prior to 15 October 2021**

CR AG.2[e] does not apply.

## **AA.12 Electronic equipment**

It is expressly permitted not to adhere to CR Section H for any electronic equipment installed aboard the boat prior to 15 April 2021.

## **AA.13 Grandfather rules applicable for a boat with its first MC**

### **AA.13.1 After 1 May 2013 and prior to 1 May 2015**

AA.1.1, AA.2, AA.3.1, AA.3.3, AA.3.4, AA.3.5, AA.4.1, AA.4.2, AA.5, AA.6, AA.7, AA.8, AA.9, AA.10, AA.11, AA.12.

### **AA.13.2 Between 1 January 2015 and 15 October 2020**

AA.1, AA.2, AA.3.1, AA.3.3, AA.3.4, AA.3.5, AA.4.2, AA.4.3, AA.5, AA.6, AA.7.3, AA.9, AA.10, AA.11, AA.12.

### **AA.13.3 Associated with a new build declaration between 1 January and 15 October 2020**

AA.1, AA.2, AA.3.1, AA.3.3, AA.3.4, AA.3.5, AA.3.6, AA.4.2, AA.5, AA.6, AA.7.3, AA.9, AA.10, AA.11, AA.12.

### **AA.13.4 Between 15 October 2020 and 15 October 2021**

AA.1, AA.2, AA.3.1, AA.3.6, AA.4.2, AA.5, AA.6, AA.7.3, AA.9, AA.12.

## **Appendix A-1: Non-standard keel design**

The keel fin shall involve a single casting. It shall have no welds or glued elements in its structure.

### **Keel fin materials:**

Forged stainless steel whose minimum requirements are:

Minimum resilience = 85 J

0.2% [RP] elastic limit: minimum of 800Mpa

Minimum elongation: 12%

The following materials are accepted:

- VG900i from 'Thyssen'
- APX4 from 'Aubert et Duval'
- And any material, which has been subject to prior written approval from the CM.

### **Geometric constraints:**

Cavities are permitted under the following conditions:

- The minimum width of a cavity is equal to: 30 mm.
- The maximum depth of a cavity in mm is equal to: [twice the width of the cavity in mm] + [90 mm].
- Cavities shall be filled with material whose density is less than 7800 kg/m<sup>3</sup>.
- No structural hatch shall be used to cover up a cavity
- The maximum depth of a cavity is equal to: 210 mm [for a cavity 60 mm wide or more]
- Added hydrodynamic elements and non-structural fairings shall be able to be dismantled for inspection.

### **Dimensioning convention:**

The XYZ reference is that of the boat

The attachment points correspond with the load zones and number 3 in total:

- Keel head axis zone.
- Keel rotation axis zone.
- Bulb to keel fin attachment zone.

The keel head insert into the **hull** shall be a minimum of 450 mm.

#### Case 1

Keel horizontal, 1g on the keel. Reaction at the keel head locked off with the angles and degrees of freedom relevant to the keel ram.

- Coefficient of 5 RP 0.2 minimum across the whole keel.
- Coefficient of 6.5 RP 0.2 minimum on the attachment points.

#### Case 2

- Grounding: Keel vertical: apply 27 tonnes to the forward tip of the bulb in the X axis.
- Coefficient of 1 minimum for the breaking strain of the material.
- Check that the elastic limit of the keel bearings and attachment points is not exceeded.
- Combined lateral and longitudinal case: Keel horizontal; Reaction at the keel head locked off with the angles and degrees of freedom relevant to the keel ram and/or emergency keel ram (choose the least favourable case).

The following shall be applied:  $[\text{Gravity Z} \times 2.5 + \text{Gravity X}] \times 2$ ; gravity X shall be applied towards the bow of the vessel and then towards the stern of the vessel.

- Coefficient of 1 minimum with RP 0.2.

NB: The required criteria is a globally elastic behaviour, namely the absence of residual deformation (of the residual deflection type on the keel fin) after the load application. The overruns of local elastic limits (in a fillet for example) are acceptable.

#### **Natural keel frequencies:**

With the keel fitted to the boat, rotational axis fitted and fixed, the hydraulic system attached and fixed in the centre plane, the keel's frequency shall be equal to or greater than:

A - 3.4Hz in torsion [Rot Z]

B - 1.1Hz in lateral bend [Rot X]

C - 4 Hz in longitudinal bend [Rot Y]

Ratio of a/b >2.7

#### **Calculation methods:**

Finite element calculations volume control type – linear domain with justification:

Recommended Tetra 6 grid: 10mm globally down to 2mm locally in fillets and attachment points;

Locking: 'Bearing' type for the rotation axis and the keel head;

Aft bearing locked in Fx + Fy + Fz;

Forward bearing locked in Fy + Fz;

Keel head locked to represent the angular components of the ram forces.

#### **Documents to be supplied to the CM:**

Grid view

Lateral Deflection @ 1.G with the keel horizontal

Mode deflections and natural frequencies

Overview - Von Mises stresses

Overview: Principal stresses

Local view for high load zones and attachment points.

XZ plan view @ Centre line: Von Mises

Horizontal view at the bearings

Horizontal view at the keel head

Horizontal view at the bulb attachment point

Horizontal view at the half-height level of the keel fin.

Horizontal view at the 200mm level above the bearings

#### **Modifications:**

No modifications shall be made to all or part of the keel without a full structural analysis being resubmitted to the CM.

## **Appendix B: Standard keel fin and standard canting system**

### **Appendix B-1: Standard keel fin**

The standard keel fin is supplied by AMPM.

#### **AB-1.1 ASSOCIATED PLANS AND DOCUMENTS**

The following plans and documents are associated with CR Appendix B.

They should be consulted with the most up to date versions of the following drawings and plans:

- o 0669\_IMOCA\_HDS\_Quille monotype\_Principe de montage Axe Verin\_20141002

- [One Design Keel Ram pin assembly principles-2014]
- 0669-1000 - Quille IMOCA - IND H - Geometrie generale - Annexe B-2013
  - [IMOCA Keel – General geometry – CR Appendix B-2013]
- 0669-1310 - Quille IMOCA - IND B - Assemblages Composite
  - [IMOCA Keel – Composite assemblies]
- 0669-1410 - Quille IMOCA - IND E - Principes assemblages metal – Bulbe
  - [IMOCA Keel – metal-bulb assembly principles]
- 0669-1420 - Quille IMOCA - IND D - Assemblages metal - Axe verin
  - [IMOCA Keel – metal - ram axis assembly]
- Plan de détail palier vérin
  - [Ram bearing details]
- Plan des entraxes 2/ assemblage verin bras
  - [Ram piston assembly]

### AB-1.2 DESCRIPTION

The supply consists of:

- the standard keel fin finished and equipped with its fairings and ready to paint.
- the ram pin.

The supply does not include:

- The keel rotation bearings.
- The bushings and locking pins and all elements required to attach the standard keel fin to the bulb.
- The bulb.
- The olive [standard keel fin fairing through the hull];
- Screws, fixings and /or all elements required to attach all standard parts together;
- All components related to the watertight integrity of the entire system [baffles, cable glands...].

The standard keel fin shall be issued with the IMOCA conformity agreement, which gives it a serial number and it must be supplied with a certificate of conformity.

The approved supplier shall provide a delivery receipt approved by the client on delivery.

### AB-1.3 INSTALLATION

The theoretical static stresses and loads that must be taken into account for the definition and construction of the structure around the keel bearings are:

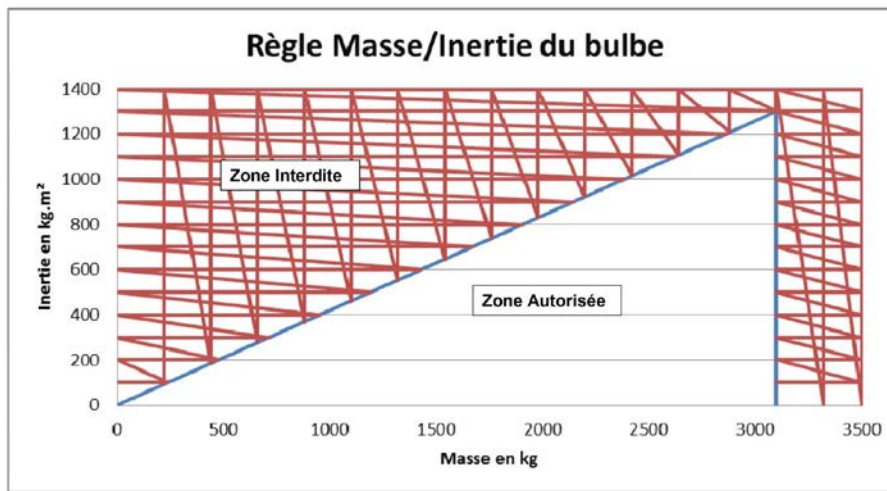
- Bottom grounding: 6.0G
- Grounding below the keel axis: 1000 KN @1.0m
- Angulation of the keel: 3.5G

	Static Load	Safety Margin	Supplier	Working Load	Static Load [SM = 1] Grounding
On the forward keel bearing	27.8 T	6.5	TEAM	180.7 T	144 T
On the aft keel bearing	13.1 T	6.5	TEAM	85.2 T	147 T
On the keel head axis	37.6 T	4	STANDARD	150.4 T	-
On the principal ram bearings	37.6 T	3	STANDARD	112.8 T	-
On the safety ram bearings	31.0 T	3	STANDARD	93 T	-

The skipper or his/her designated representative shall submit a report to the CM detailing the corresponding studies.

### AB-1.4 BULB WEIGHT / INERTIA

The bulb shall conform to the following limits:



## Appendix B-2: Standard canting system description

The *standard canting system* is supplied by Hydroem.

### AB-2.1 PLANS AND ASSOCIATED DOCUMENTS

The following plans and documents are associated with CR Appendix B.

Only the most recent versions and revisions should be consulted:

- 3D Peripherique Electronique – STEP:
  - ARMOIRE CAPAS V2 AVP0.STEP
  - GESTION QUILLE L2 AVP0.STEP
- 3D Peripherique Hydrauliques – IGS:
  - 5 Vase d'expansion.IGS
  - Groupe électro-hydraulique lynch.IGS
  - Manifold.IGS
  - Pompe manuelle.IGS
- 3D Systeme Principal – STEP:
  - 0669 - IMOCA Quille Standard - Assemblage General 0° - date.STEP
  - 0669 - IMOCA Quille Standard - Assemblage General 38° Babord - date.STEP
  - 0669 - IMOCA Quille Standard - Assemblage General 38° Tribord - date.STEP
  - Bras de securite.IGS
  - Verin hydraulique.IGS
- NOMENCLATURES:
  - Bras de securite Nomenclature 3D
  - Groupe electro-hydraulique lynch
  - Manifold Nomenclature 3D
  - Vase d'expansion
  - Verin hydraulique Nomenclature 3D
- Note 1 : Specifications for setting up and using the standard canting system V1.2

These plans and documents are available from the *IMOCA* secretariat [contact@imoca.org].

### AB-2.2 TECHNICAL DESCRIPTION

#### [a] Keel head pin

Pin diameter 70 mm made of Inconel 718 (nickel-based stainless steel alloy)

#### [b] Ram with ball joint trunnion

- i. Hydraulic ram of 17-4PH stainless steel, bore diameter  $\varnothing$  140mm, tip and tail in titanium.
- ii. Rod 17-4PH  $\varnothing$ 65 with carbide deposit, 550 mm travel corresponding to 38°.
- iii. Trunnion with cylindrical  $\varnothing$  75 mm bushes.
- iv. Rod end 17-4PH, eye  $\varnothing$ 160 with CuBe<sup>2</sup> beryllium swivel bushing for a  $\varnothing$  70 mm pin.
- v. Position sensor integrated into the rod.
- vi. 2 cupro-aluminium swivel bushings  $\varnothing$ 98\* $\varnothing$ 75\*55 mm.
- vii. 2 aluminium 6083 swivel trunnions of  $\varnothing$  230 mm for a 45 mm thick bulkhead.

### **[c] Mechanical lock**

- i. Titanium female open clevis pin head suitable for the Ø70 mm diameter keel head pin.
- ii. Rod Ø 65 mm 17-4PH.
- iii. Kneecapped swivel, Ø 75 mm clevis and Ø 34 mm rod.
- iv. Aluminium 7075 trunnion with Ø 75 mm cylindrical bushes.
- v. Two cupro-aluminium swivel bearings Ø 98 \* Ø 75 \* 55 mm.
- vi. Two aluminium 6083 Ø 230 mm trunnion bearings suitable for a 45 mm thick bulkhead.
- vii. Titanium Ø 60mm split pin.
- viii. Ertalyte ring for baffle attachment.
- ix. Two cupro-aluminium bushings with Ø 76mm female clevis pins.

### **[d] Drilled hydraulic manifold block**

- i. 24 volt electric release with integrated auxiliary manual system.
- ii. Electrically operated valves with progressive release.
- iii. Overload release valves.
- iv. Anti-cavitation valve.
- v. Flow regulator for release function.

### **[e] Hydraulic control system**

- i. LYNCH electric motor 24 volts 4500 Watts.
- ii. Half-cant time between 32 and 40 seconds.
- iii. 350 bar rated components.
- iv. 24 V system with manual auxiliary controls.
- v. Moulded watertight cables with control LED indicator lights.
- vi. Damping accumulator.
- vii. Kit of 6 flexible links with Minimesse® junctions and visual manometers.
- viii. 8-litre principal hydraulic oil tank.
- ix. 12-litre air expansion tank with manometer.
- x. Outlet control system capable of functioning at 360°.
- xi. High pressure filter at control system outlet. Epoxy painted control system (white).
- xii. Separate manual auxiliary pump.

### **[f] JPS Concept operating controls**

- i. Three keel cant control boxes [one internal and two external [port and starboard].
- ii. A relay box with position indicator.

Principal functions:

- Keel to port
- Keel to starboard
- Release/By-Pass
- Stop
- Keel to the centre plane
- Tacking and gybing command

### **[g] Power Pack: 2 Capas + 1 Charger + 1 Container**

### **[h] Summary of the weight estimate of components**

- Ram and connecting rod 84 kg
- Set of bearings Ø 250 mm [2x4] 8 kg
- Mechanical locking system 34 kg
- Set of bearings Ø 250 mm [2x4] 8 kg
- 5kg threaded block
- Valves and connections 1.2 kg
- 4500-watt hydraulic control and manual pump 23 kg
- Expansion tank 2.5 kg
- Control and relay boxes 1.6 kg
- Power pack [Capa] 16 kg

- **First Use**

The first time the *standard canting system* is used it shall be in the presence of the approved suppliers. First use shall include sea trials. A test report will be drawn up by the supplier, approved and stamped by the client.

- **Suppliers' recommendations**

All the suppliers' recommendations are available in the operating manual [Note 1] and shall be adhered to in a seamanlike manner for safe use.

The keel system in particular must be protected against electrolysis issues.

- **Inspections and maintenance**

The *standard canting system* shall be regularly maintained.

Maintenance must be carried out by the approved supplier or under their control.

Under no circumstances shall the system be dismantled without prior consultation with and approval from the official supplier.

Inspection and/or maintenance records may be required in order to renew the MC.

## Appendix C: Standard mast

The *standard mast* is supplied by LORIMA and the studies are carried out by GSea Design.

### AC.1 PLANS AND DOCUMENTS ASSOCIATED WITH APPENDIX C:

[a] The following plans are associated with CR Appendix C.

Only the plans with the most recent revisions and/or the most recent date stamp should be consulted.

Mast:

- i. 1050z-01-200 Plan general mat aile - diffusion 2019 revA [Wing mast general arrangement].
- ii. 14000- Renfort ancrage tweaker [Tweaker anchorage reinforcement].
- iii. 14000- Vue de detail extremite Outrigger [Detailed view of outrigger outer extremity].
- iv. C12001 Lock car-Model [Halyard slider lock].
- v. 1050z-01-300 Plan de moule - diffusion 2019 revA [Mould drawing].
- vi. 1050z-01-400 Plan de drapage - diffusion 2019 revA [Layout drawing].
- vii. 1050z-03-200 Plan outrigger - diffusion 2019 revA [Outrigger drawing].
- viii. HGV-H27Renfort rail\_2020\_07\_23.zip [6 files] [Track reinforcement]
- ix. Updated plans of the mast step with a choice of 2 models
- x. Updated plans of the plates for full mainsail, reef 1-2-3, head car + reef 4 screw.
- xi. Plans of the 'fittings' associated with running backstays, forestays 2, 3 and spare forestay 3.
- xii. [Add new drawings that are available]

[b] Note 2: Mast stepping specification and use of the standard wing mast and Procedure V2 HGV 2020 reinforcement.

Note 2 is supplied by the builder when the mast is delivered

For safe use of the *standard mast* the skipper shall use best practice and good seamanship with the guidelines described in Note 2.

These plans and the Note 2 are available from the *IMOCA* secretariat [contact@imoca.org]:

The diagrams in this document are functional diagrams.

### AC.2 MAST STEPPING

The following rules shall apply with regard to the stepping of the mast.

#### AC.2.1 FORCES AND LOADS

Note 2 describes the theoretical static loads and forces.

The stepping of the mast shall take into account this data.

The **hull** structure and all associated equipment shall be built with these forces in mind and with sufficient safety factors to be able to safely compete in Category 0 races.

## AC2.2 POSITION OF ATTACHMENT POINTS AND MAST STEP

- (a) The 0 reference of the mast [as defined in AC.4(a)] shall be positioned between X= 7700 mm and X= 8700 mm (X=0: it is the aftermost point on the hull).
- (b) The outrigger tie-rod attachment points shall be positioned on the **boat** in such a way that the angle between the tie-rod and the outrigger is greater than 23.3 degrees in the plane formed by these two axes.
- (c) The minimum and/or maximum angles of the forestays and running backstays shall comply with the stepping of the mast on deck and are defined in AC.1 [a] i. They are measured for a 4.0-degree rake. They are referred to in the table below:

Forestay No.	Forestay name	Minimum angle*	Maximum angle*	Sail set on the forestay
Forestay 0	J0	22°		J0 or spinnaker
Forestay 1	J1	18.5°		J0 or J1
Fractional forestay	FRAC			FRO
Forestay 2	J2	17.7°	20°	J2
Forestay 3	J3	17°	21°	J3 or storm jib
Running backstays		14°	18°	* upper position

## AC2.3 RAKE AND ROTATION

- (a) See F.2 (b).
- (b) The mast rotation angle shall not exceed +/- 40° in relation to the longitudinal centre plane of the boat.

## AC.3 RIGGING

### (a) Lateral standing rigging

The 2 cap shrouds (G1) and 2 lower shrouds (G2) are supplied with the *standard mast*. The SK loops used to attach G1 and G2 to the mast are supplied with the *standard mast*. Chafe protection may be installed on the G1 and G2 in such a way that it does not alter their mechanical properties. Fairings and other systems intended to improve the aerodynamics or affect sail trim are expressly forbidden.

### (b) Outrigger tie-rods

The 2 tie-rods are supplied with the *standard mast*. Their lengths are unrestricted and shall be determined by the client of the *standard mast*. Chafe or impact protection may be installed on the tie rods in such a way that it does not alter their mechanical properties. Fairings and other systems intended to improve the aerodynamics, hydrodynamics or affect sail trim shall be expressly forbidden.

### (c) Forestays and running backstays

The rig of the *standard mast* shall comply with the table below:

	Cable name and sail name	W1 (T)	EA mini (MN)	EA Max (MN)	F Rupture (T)	Maximum pre-tension	Material
Cap shroud	G1	5.5	23.77		28	2	Carbon EC6
Lower shroud	G2	4	12.8		15	1	Carbon EC6
Tie-rod	Tie-rod	18	36.74		44	7.5	Carbon EC6
Forestay 0	J0	6.5	11	25	15		PB0 or SK
Forestay 1	J1	7.5	22	28	25		PB0 or SK

Forestay 1 (without sail)	J1 replacement	7	15				PB0 or SK
Fractional forestay	FRAC	5	10	20	15		PB0 or SK
Forestay 2	J2	8	22	28	25		PB0
Forestay 3	J3	5.5	12	18	15		PB0 or SK
Forestay 3 (without sail)	J3 replacement	5	12		15		PB0 or SK
Running backstay	Running backstay	6.5	14	20	20		PB0 or SK
Running backstay deflector	Deflector	6	14	20	20	0.2/0.3	SK

The Running backstays, forestay 2, forestay 3, forestay 3 [without sail], the running backstays and the running backstay deflectors shall be supplied with the *standard mast*.

Their lengths are unrestricted and shall be specified by the client of the *standard mast*.

The lashings and loops used to attach this rigging to the mast are not supplied with the *standard mast*.

Protection to combat chafe or impact is expressly permitted provided that this does not alter the rigging's mechanical properties.

Fairings or other systems intended to improve the aerodynamics, hydrodynamics or affect sail trim shall be expressly forbidden.

An attachment point added to a sail that is not at the end of the cable may be installed.

#### AC.4 MAST DESCRIPTION

##### [a] Tube

- Reference axes: X → horizontal; Y → transversal; Z → vertical
- 0 reference [0 mast = 0 layup]: It is the intersection of the lowest point of the aft face of the tube and the base of the ball of the mast step.

##### [b] Tube geometry

- Maximum chord 540 mm
- Maximum thickness 285 mm
- Aft face width 45 mm
- Tube length 27300 mm from the masthead to the bottom of the mast step

##### [c] Tube weight and centre of gravity position:

- Vertical position of the rig's centre of gravity: 11.06 m +/-1%
- Rig weight: 375 kg (including corrector weights)
- Rig reference static moment  $4 \cdot 10^6$  kg.mm

The CM shall add corrector weights if necessary, to bring the rig weight up to 375Kg.

They shall be sealed in place in the location defined in the *measurement protocol*.

##### [d] Mast track and mainsail halyard hook

- Mainsail mast track: HARKEN HGV-H27
- Mainsail head car: Lock with internal remote-control HARKEN HGV-H27
- Fixings: A4-80 [threaded only in the carbon]
- Reinforced area over 300 mm at each reef level along the first batten [See AC.1 (a)(viii) & (b)]

##### [e] Mainsail head altitude

- Full mainsail Z = 27,300 mm
- First reef Z = 23,500 mm
- Second reef Z = 19,400 mm
- Third reef Z = 14,700 mm
- Fourth reef Z = 9,207 mm

##### [f] Mast step

- The mast is stepped on a ball
- The mast step is supplied with the *standard mast*



- The halyards may pass through the ball

**[g] Rotation arm**

- A single attachment point at  $Z = 370$  mm on the forward face of the mast tube.
- The section is stiffened by an omega to prevent warping.

**[h] Gooseneck**

- The gooseneck is a carbon bracket with bushing and a pin.
- Altitude  $Z = 700$  mm
- Under the gooseneck, in the reinforcement, 2 double friction sheaves may be used to deflect the lock control and the sheet blocks.
- The loads and conditions of use are described in Note 2.

**[i] Cunningham**

- Level with the gooseneck, in the reinforcement on the starboard side, a toggle may be used to terminate the cunningham.

**[j] Boom vang**

- No boom vang or equivalent system designed to adjust the leech tension of the mainsail shall be attached to the mast and/or the mast step.

**[k] Radar**

- 1 reinforcement and cable hole and/or support bracket attachment is situated on the forward face of the mast.
- The centre of the radar cable hole shall be positioned at an altitude  $Z$  between 3462 and 3676 mm.
- The radar bracket shall be bonded to the mast and is not supplied with the *standard mast*.
- Deck lights may be installed close to the radar bracket.

**[l] Lazyjacks**

- The lazyjacks shall be attached to the lower shroud chainplates or their lashings or loops.

**[m] Shroud attachment points**

- Upper shrouds: Altitude  $Z = 25600$  mm
- Lower shrouds: Altitude  $Z = 13500$  mm

**[n] Forestay attachment points**

- The attachment points are toggles designed to support a halyard lock with a lashing or loop.
- The halyard exits are situated below the attachment points.
- J0: Altitude  $Z = 27250$  mm  
[The J0 attachment point is specified to be used by the J1 if required]
- J1: Altitude  $Z = 26900$  mm
- FRAC: Altitude  $Z = 22500$  mm
- J2 (Fixed forestay): Altitude  $Z = 22100$  mm
- J3: Altitude  $Z = 15500$  mm

**[o] Running backstays**

- Masthead running backstay: Altitude  $Z = 26800$  mm
- Lower deflector: Altitude  $Z = 22200$  mm
- Deflector is fitted with a 'Hook' that only has two positions (ON/OFF)
- Deflector shall be pre-tensioned to 0.2 to 0.3 tonnes in the OFF position.

**[p] Masthead**

- The masthead is a laminated U-shaped carbon sheave box.
- Mainsail halyard: a single fixed point can be used for the halyard.
- The masthead units, antennas and navigation lights are not supplied with the *standard mast*. Their installation and mounts are unlimited by the CR.

**[q] Protection**

- A protective patch may be placed on the mast. It shall be required to demonstrate that these patches are non-structural and are solely for the purpose of protecting the mast.
- Under the radar, 'soft padeyes' may be bonded to the mast to serve as deflector terminals or to attach unused halyards to.
- The mast step may have a mast rotation angle sensor device attached to it.
- The mast shall be painted and may be decorated with advertising vinyls.
- And conform to CR Appendix G.

**[r] Outriggers**

- Outrigger lengths: 6250 mm.
- The outriggers shall be stepped in the mast step supplied with the standard mast.
- The outriggers may be used for headsail trim, under the following conditions only.

Outrigger use criteria:

The outrigger is structured, along its length, to accept a maximum working load perpendicular to the axis of 1 tonne.

Any additional load applied to the outrigger shall be made via a textile strop with a minimum width of 50 mm. This strop shall apply the previously specified load solely in the 350 mm zone as described in the drawing entitled "14000-Renfort ancrage tweaker".

This strop shall be retained in place along the longitudinal axis of the outrigger so as to avoid crushing the tube at the point of attachment. The strop diameter shall be sufficient to avoid causing the tube to crush along its periphery when under load, regardless of orientation. The strop shall not transfer rotational loads onto the outrigger in such a way that the cap shroud terminal fitting acts as a stop.

The termination of the retainer shall not be attached to the standing rigging.

[S] Choosing to use optical fibre is expressly permitted. This standard solution shall not be modified.

[t] A flash light at the masthead.

**AC.5 DELIVERY**

[a] IMOCA shall issue a serial number to each standard mast that shall be clearly displayed for identification purposes.

[b] The entire standard package shall be delivered with:

- [i] A certificate of conformity;
- [ii] Note 2;
- [iii] The standard study as defined by IMOCA.

[c] A delivery receipt from the supplier approved and stamped by the client.

**Appendix D: Exemptions from OSR Cat 0**

[Agreed by the FFVoile until 31/12/2021]

**Exemption No.1** OSR 3.03 [Hull Construction Standards] is replaced by CR: D.1 [c] and [d].

**Exemption No.2** OSR 3.13.1 [Watertight Bulkheads] is replaced by CR: D.8.1.

**Exemption No.3** OSR 3.13.5: [Access Hatch Closure] is replaced by CR: D.8.2.

**Exemption No.4** OSR 3.14.6 [Lifeline Specifications] is replaced by FFVoile Prescription No. 4 and CR: C.9.2 [c].

**Exemption No. 5** OSR 3.19.1 [Bunks] is replaced by CR: C.10.1.

**Exemption No.6** OSR 3.23 [Bilge Pumps and Buckets] is replaced by CR: C.3.2.

**Exemption No.7** OSR 3.18.1 [Toilet] is replaced by: Solely for singlehanded or double-handed races, OSR 3.18.1 is replaced by FFVoile Prescription No.6: "There must be a bucket fitted and allocated for this sole use, secured in a dedicated site."

For crewed races, OSR 3.18.1 is replaced by CR: C 10.4.

**Exemption No.8** OSR 3.28.1 b) [Propulsion Engines] is replaced by CR: C.6.1 [b].

**Exemption No.9** Solely for singlehanded or double-handed races: OSR 3.29 [AIS] is replaced by CR: C.7 [b] and [d].

**Exemption No.10** OSR 3.29.3 [Watertight Satellite Telephones] is replaced by CR: C3.20 [b][ii] and C7.2.

**Exemption No.11** OSR 3.29.11 [Radar] is replaced by CR: C.3.14.

**Exemption No.12** OSR 4.02.1 [Search and Rescue Visibility] is replaced by CR: C.8.

**Exemption No.13** OSR 4.05.2 [Fire Extinguishers] is replaced by la prescription FFVoile No.10 and CR: C.3.12.

**Exemption No.14** OSR 4.07.1d) [Searchlights] is replaced by CR: C.3.22.

**Exemption No.15** OSR 4.10.1 [Passive Radar Reflector] is removed.

**Exemption No.16** OSR 4.13.2 [Depth Sounders] is replaced by CR: C.7.2 [h].

**Exemption No.17** OSR 4.20.1.c), 4.20.2.a) and 4.20.3.c) [Life Rafts] are replaced by CR: C.3.4.

**Exemption No.18** OSR 4.20.1 [Life Rafts] is completed by: "4-person life rafts stored in a SOLAS-type bag are acceptable".

**Exemption No.19** OSR 4.26.2[c] [Sail Areas] is replaced by FFVoile Prescription No.14.

**Exemption No.20** OSR 4.30 [Emergency Pumps] is replaced by CR C.3.2.

**Exemption No.21** OSR 5.03 [Personal Location Lights] is replaced by CR C.3.8 [b) and (d)].

## Appendix E: Branding layout

The branding layout and description of the *dock sail* are available from the IMOCA secretariat [contact@imoca.org].

## Appendix F: CRC / Measurers

### Composition of the CRC

- Daniel Andrieu: Naval Architect
- Simon Forbes: World Sailing
- Philippe Pallu de la Barrière: C.R.A.I.N.

### List of official measurers

- *IMOCA* Chief Measurer: René BOULAIRE: chief.measurer@imoca.org
- Official *IMOCA* Measurers:
  - Europe: Manu GUEDON: manuguedon@free.fr
  - New Zealand: Jim MC ELREA: jmcclrea@xtra.co.nz

## Appendix G: Material limitations, construction methods, finishing products.

### AG.0 DEFINITION

*Alternative material*: Material able to be made from a natural fibre [organic or mineral matrix], recycled material or composite materials compatible with the human body and intended to be used alone or in combination with other materials [resin] of the same kind for the design of a composite.

### AG.1 MATERIALS

The **boat**, without **sail(s)**, in the *lightweight configuration* [without associated electrical, electronic equipment] shall be built using the following materials which shall be *commercially produced*, unless subject to a specific authorisation or ban described in the CR, in CR Appendix G or from the CM:

- Aluminium.
- Steel, stainless steel.
- Titanium.
- Bronze, lead.
- Epoxy, polyester and vinylester resin.
- Glass fibre, aramid fibre and carbon fibre with a tensile modulus less than 280 Gpa.
- Nomex® [Aramid Honeycomb Paper], PVC or SAN foam.
- Wood.
- Moulded plastic and thermoplastic.
- Paint and other chemical products in compliance with CR Appendix AG.3.
- The rigging [running and standing] shall be made of: Carbon, Aramid, Vectran, SK, Polyethylene, Polyester and/or PBO.

All composite components of the boat [including the **hull**, [not including the associated fittings], the *foils*, *rudders*, the boom and spars] except the **sails**, shall conform to the following specifications:

- The fibres listed below are permitted:
  - Hexcel®: IM 7 [6k]; IM2A; IM2C; AS7.

- Mitsubishi Chemical Carbon Fiber and Composites®: MR40; MR60H.
- Tenax®: IMS 60; IMS 65.
- Toray®: T800H; M30S; T700S.
- Tornel®: T650/42.
- T800SC & T800S

Subject to the CM's approval, all fibres shall have a tensile modulus less than 280Gpa.

- HM fibres are expressly prohibited except for the boom, spars and *foils* which may have M40J, M46J, HS40 or HM63 (Industrial) fibres.
- Nomex® [Aramid Honeycomb Paper] or foam [PVC and SAN] or *alternative material* shall be the only core materials used.

Para-aramid (N636 or equivalent) or metallic cores shall be expressly forbidden.

The core materials shall be *commercially produced*.

- The nominal weight of each glue film or weight of any combination of adhesive layers used to glue Nomex® [Aramid Honeycomb Paper] or foam cores [PVC and SAN] or an *alternative material* shall be at least 300g/m<sup>2</sup>.
- The use of nanosciences, nanotechnologies and other associated sciences and technologies shall be expressly forbidden in any resin system for any part of the **boat**, with the exception of the **sails**.
- The nominal weight of each *ply* shall be greater than or equal to a minimum of 200g/m<sup>2</sup> and applies to each ply of fibre.

## AG.2 CONSTRUCTION METHOD

[a] The **hull**, excluding associated fitout, the *foils* and *rudders*, shall not be heated to temperatures above 135°C during the manufacturing process and possible post curing stages.

[b] The hull shell, the deck including any superstructure, the transom and the cockpit(s), excluding internal structure and associated fitting, shall not be built using an autoclave. The maximum pressure applied for vacuum-assisted construction shall be 1.1 Bars.

[c] No areas of the hull shell below DWL -200mm shall be built with 'Aramid Honeycomb Paper (Nomex®)-type materials.

[d] A maximum of 4 reference core materials of the Aramid Honeycomb Paper (Nomex®)-type and a maximum of 2 'foam' or *alternative material* types shall be the only core materials permitted for the deck including any superstructure, the transom and the cockpit(s), excluding internal structure and associated fitting. Each reference is associated with a single property, a single thickness and a single density of material.

[e] *Foil* stocks shall be built solely from carbon and resin monolithic which comply with appendix G. HM fibres shall not be used in a stock built using a construction principle other than that stated 'in the plan'.

## AG.3 FINISHING AND PAINTING for the hull shell and the *hull appendages*.

[a] All products used for finishing and painting shall be *commercially produced*.

[b] Plastic films and vinyls may be used for the sole purpose of branding and decorating the boat.

[c] The *working deck* and all surfaces where any member of the crew needs to move to when under way shall be finished with a non-slip surface.

## Appendix H: Lightweight configuration

Putting the **boat** into *lightweight configuration* shall be the responsibility of the *skipper* or their designated representative who must sign the *checklist*.

Each piece of the **boat's** equipment shall be stowed in the position it would be *when racing*, in accordance with the CM.

Subject to the CM's approval, all equipment designed to charge the batteries by generating *renewable energy* (hydrogenerators, solar panels, wind turbines...) without any kind of fuel and any equipment made from *alternative material*, which is non-structural and able to be dismantled shall not have its weight included in the displacement of the boat in *lightweight configuration*, within a 100 kg limit.

Any *scientific equipment* shall be able to be dismantled and shall not be integrated in the weight of the boat in *lightweight configuration*.

For each step described below a set of photographs shall be provided.

These photographs may be used as proof within the boat's measurement files.

#### BOAT EXTERIOR:

- The spars, all standing rigging, all running rigging and associated equipment and deck fittings.
- All halyards brought to the foot of the mast (with their locks if they are so equipped).
- Furling drums in position with the deck fittings and their associated running rigging.
- All fixed deck fittings and deck hardware.
- Lifelines, pushpits, pulpits, stanchions, navigation lights.
- Movable cockpit protection equipment if any, in the protection position (solid or fabric cuddy)
- Cabling and antennae associated with the VHF and AIS systems.
- Operational radar installed.
- Electronic equipment powered electrically or otherwise (various antennae, etc.) shall be in place.
- Equipment connectors installed for all equipment (pilot, electronics, IT, etc.).
- Keel at zero degrees cant (0°).
- *Hull appendages* installed in the 'fully lowered' position except when their respective positions are defined in a rule or by the CM.
- *Rudders* in the 'fully lowered' position.

#### BOAT INTERIOR:

- *Standard canting system* or any keel canting system.
- Fresh water tanks checked empty.
- Water ballast tanks and associated plumbing checked empty.
- All watertight bulkhead hatches and locking mechanisms in place.
- Operating 'main' propulsion unit, and if diesel, with its oil and any equipment (shaft, propeller, etc.).
- Engine starter (batteries, super capacitor, etc.) with the full recharging system.
- Fixed fuel tanks empty except for a minimum amount of diesel (minimum 5 litres) allowing powered manoeuvres for the purposes of measurement operations.
- All other tanks empty with the exception of the hydraulic systems used in normal sailing trim.
- All service batteries, other than the engine starting battery, with their associated charging systems installed.
- The permanently installed draining system as described in C.3.2(b).
- Interior fitout and associated equipment.
- Navigation seat if solid.
- The number of *bunks* according to C.10.1(a) and (b).
- Cooking stove installed and operational (including fuel tank).

At least the equipment described in C.7.1(a), C.7.2(a) & (b) & (e) & (f) & (g) & (h) & (i) and C.3.14 shall be operational.

Shall be removed from the boat:

- **Sails.**
- Mainsail lazyjacks.
- Flying deck hardware and running rigging not listed above.
- Ground tackle.
- Safety equipment.
- Outriggers, if any (spreaders, jockey poles, etc., not included in the *standard mast*)
- All moveable equipment not attached or linked to the boat.
- All consumables, freshwater containers, the emergency fuel tank and navigation equipment.
- Clothing, victuals, personal effects, etc.
- In general, any other piece of equipment as required by the CM.
- Communication equipment supplied by TOR and *scientific equipment*.

## Appendix I: Interpretations

These documents are available from the *IMOCA* class secretariat (contact@imoca.org).

## Appendix J: Reserved

## Appendix K: Measurement Certificate and associated documents

### Appendix K-1: *IMOCA* Measurement Certificate

This document is issued by *IMOCA* and prepared by the CM [[chief.measurer@imoca.org](mailto:chief.measurer@imoca.org)].

### Appendix K-2: New build declaration form

This document is available from the *IMOCA* class secretariat [[contact@imoca.org](mailto:contact@imoca.org)].

### Appendix K-3: Documents to be supplied to the CM to obtain a MC

The document list is described in the *measurement protocol* drawn up by the CM [[chief.measurer@imoca.org](mailto:chief.measurer@imoca.org)].

### Appendix K-4: MC renewal request form

This document is available from the *IMOCA* class secretariat [[contact@imoca.org](mailto:contact@imoca.org)].

## Appendix L: Contacts



### Headquarters

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### World Sailing

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Simon FORBES – Technical Manager: [simon.forbes@sailing.org](mailto:simon.forbes@sailing.org)

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GSea Design: 19, rue Jules Guesde, 56100 Lorient, France.  
Contact: Benjamin Madec: +33 [0]2 97 78 11 91

Hydroem: 4 Rue Eugène Freyssinet, 17140 Lagord, France.  
Contacts: Francis Merieau: +33 [0]6 11 54 19 01  
Michel Farre: +33 [0]6 03 47 93 46

Iroise Rigging: 35 Rue Ingénieur Verrière 56100 – Lorient, France  
Contact: Eric Cochet: +33 [0][0]6 80 74 63 02

LORIMA: 7 Rue du Commandant l'Herminier, Base des sous-marins, 56100 Lorient, France  
Contact: Nicolas Rabillé: +33 [0]6 80 23 08 12

## Appendix M: Standard boom

The *standard boom* is supplied by the company ?? and the studies are carried out by the company Gsea Design.

### AM.1 PLANS AND DOCUMENTS ASSOCIATED WITH CR APPENDIX M:

- [a] The following plans are associated with appendix M.
- [b] Note 3

### AM.2 INTEGRATION ON THE BOAT

### AM.3 DESCRIPTION

## Appendix N: Sail Identifications & Limitations

This document is available from the *IMOCA* secretariat [[contact@imoca.org](mailto:contact@imoca.org)].

## Appendix O: Foil Limitations

-> 2 designs

-> +1 extra design for TOR

This document is available from the *IMOCA* secretariat [[contact@imoca.org](mailto:contact@imoca.org)].

## Appendix P: Standard Communication System

The *standard communication system* is supplied by Thales and Iridium.

A VesseLINK 700 terminal with activated SIM card shall be on board.

There must be no visible branding on the devices or antennae from a brand that is in competition with the suppliers chosen by *IMOCA*.

### AP.1 PLANS AND DOCUMENTS ASSOCIATED WITH APPENDIX P:

- [a] The following plans are associated with CR Appendix P.
- [b] Note 4.

### AP.2 INTEGRATION ON THE BOAT

### AP.3 DESCRIPTION

## Appendix Q: Electronic equipment

This document is available from the *IMOCA* secretariat [[contact@imoca.org](mailto:contact@imoca.org)].